The Mining Journal

LONDON, DECEMBER 5, 1958

Vol. 251. No. 6433. Price Ninepence

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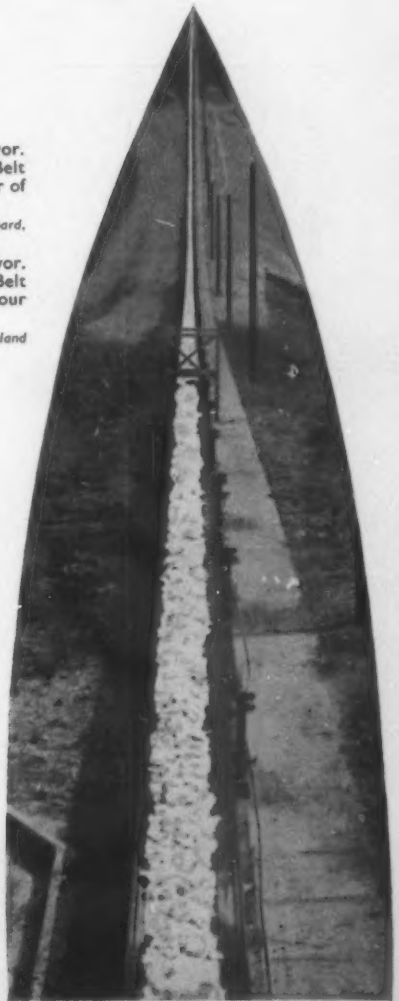
Whatever the Load
Whatever the Distance

Left: CABLE BELT rope driven conveyor. Length 7,500 feet, Lift 220 feet, 42 in. Belt at 350 ft./minute, handling 600 tons/hour of R.O.M. Coal.

Photograph by permission of the National Coal Board, East Midlands Division, Bestwood Colliery.

Right: CABLE BELT rope driven conveyor. Length 7,260 feet, Lift 300 feet, 24 in. Belt at 200 ft./minute, handling 200 tons/hour of chalk.

Photograph by permission of the Associated Portland Cement Manufacturing Company Limited.



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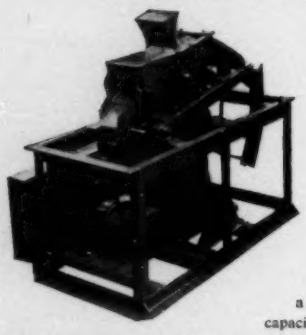

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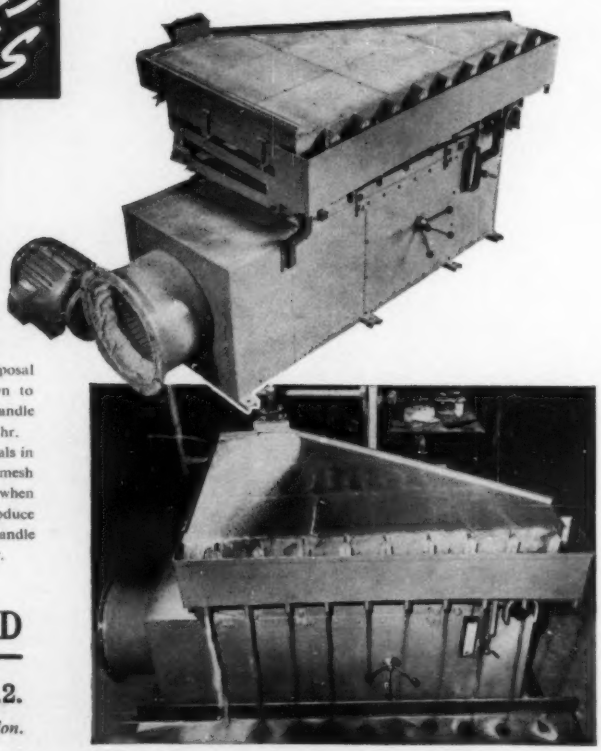

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D-113	7½	2000	125	-	1000′	700′	650 lb	36½″	23½″	20¼″	F.L.P. Electric
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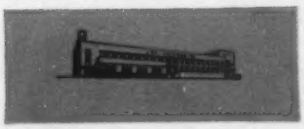

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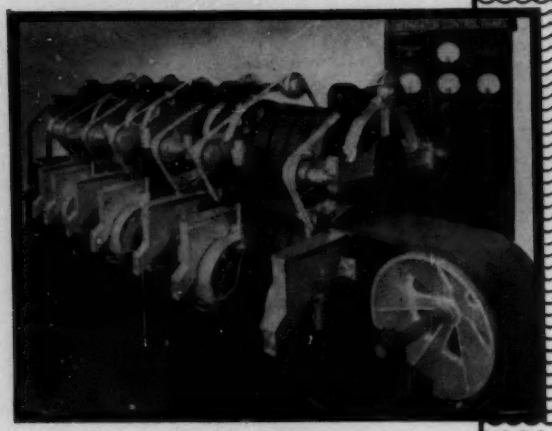

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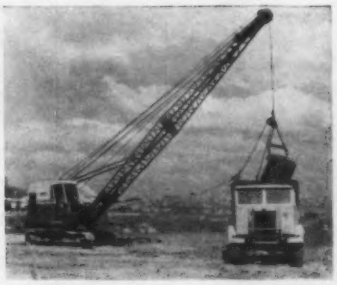

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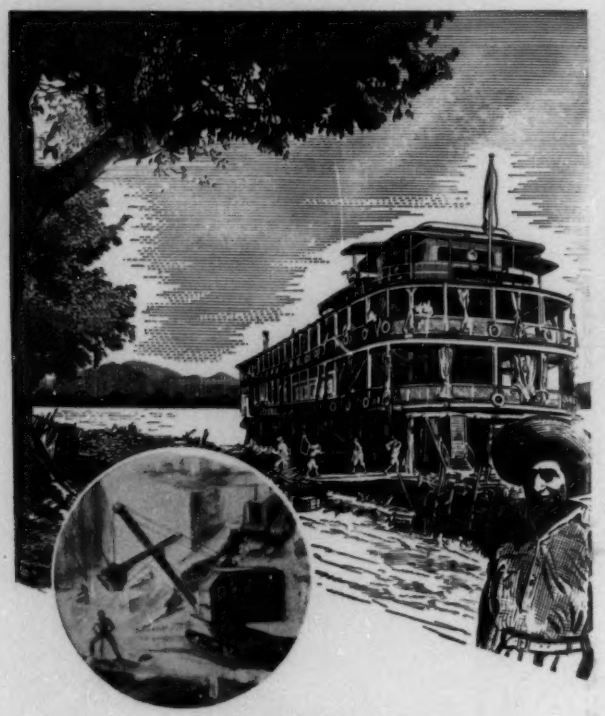

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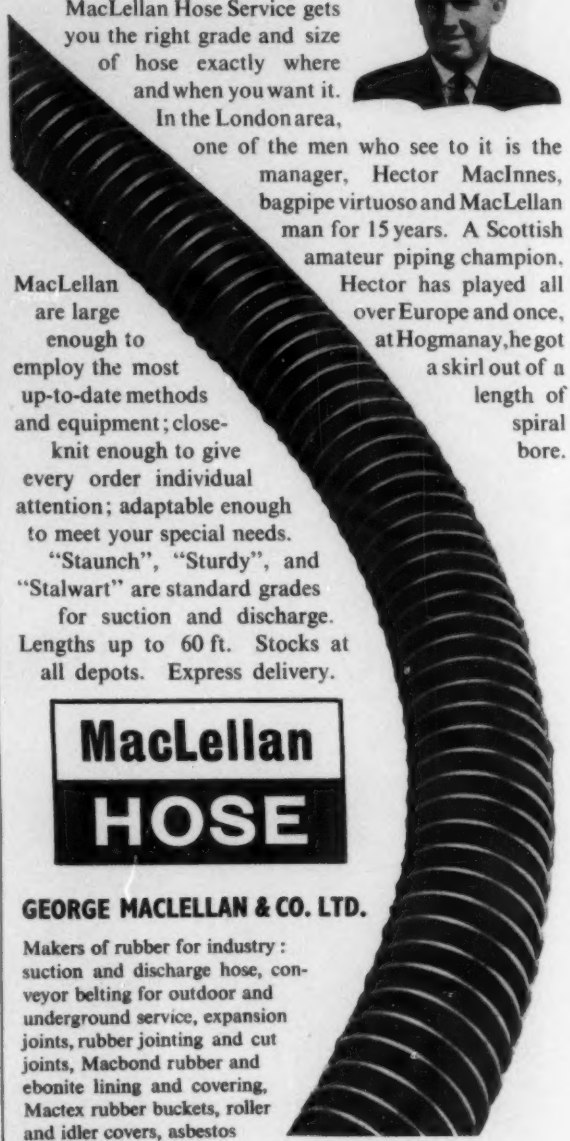

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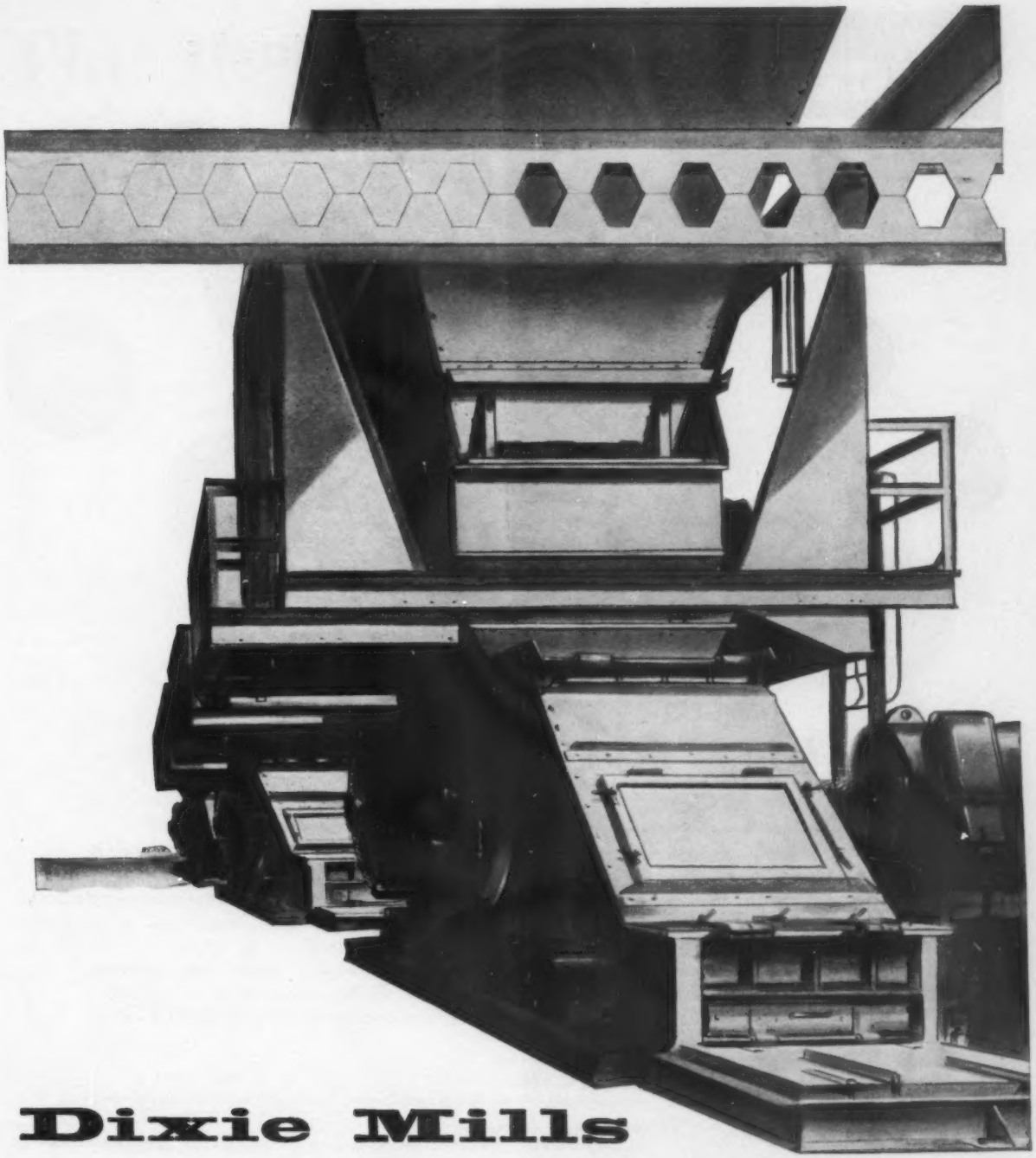

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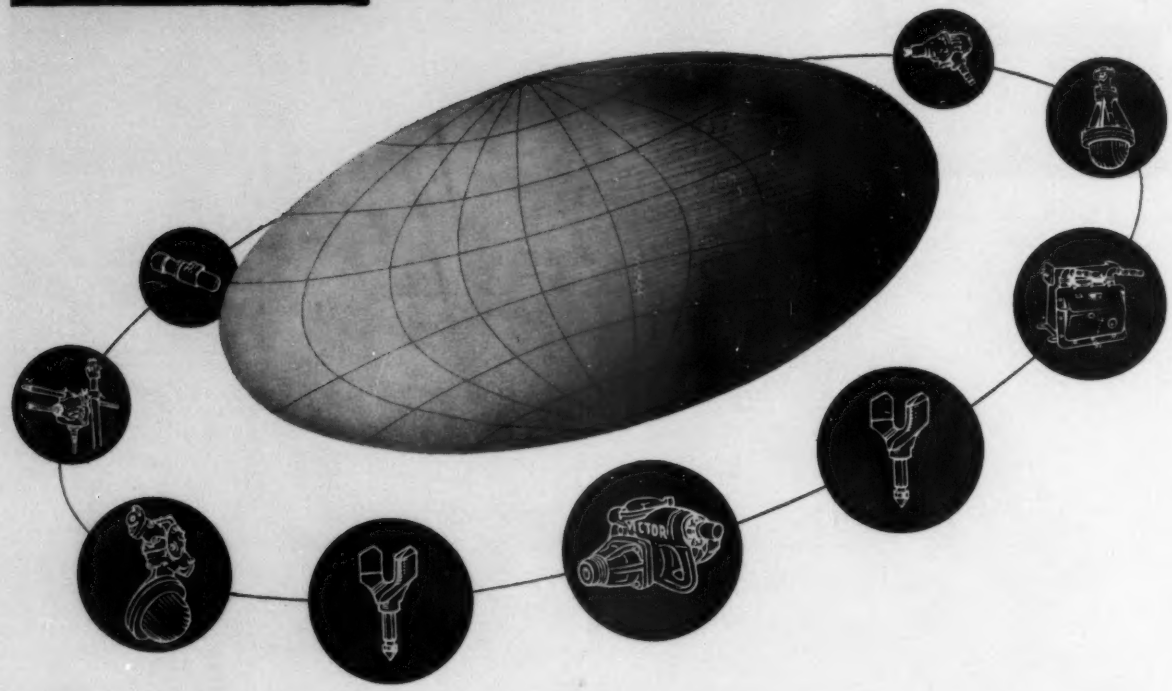

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The Mining Journal

London, December 5, 1958

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And Now Aluminium —

THE Trinidad Oil Company — the South-West Africa Company — British Aluminium. What next? Between such recurrent crises, each of which produces a fleeting outburst of vociferous protest, we relapse into our normal condition of acquiescence in the absence of any government minerals policy. When will it be realized that while takeover bids by American companies or—as in the latest instance—attempts by foreign interests to acquire large holdings in British companies—are in themselves entirely legitimate operations, they are, nevertheless, symptomatic of a wasting disease which has been both continuous and progressive throughout the past decade.

The root causes are, in the first place, the absence of a mineral resources policy, whether for the Commonwealth as a whole or for the United Kingdom as a major consumer and importer of metals and minerals, and secondly, the fact that our own capital resources are inadequate to finance all the projects at home and abroad which we should like to undertake.

It is regrettable that in the controversy which has arisen over the two opposing plans for the future of the British Aluminium Company, more prominence has not been accorded to this basic problem, which is of far greater national importance than the merits or demerits of the board's actions or the interests of the shareholders themselves.

British Aluminium manufactures nearly a third of all the aluminium products made in the United Kingdom, drawing its supplies of metal mainly from its refineries in Scotland and from Canadian British Aluminium Company's refineries in Canada, in which it has a controlling share. The latter undertaking was embarked upon by the British company to ensure its supplies of primary metal. Its capacity is currently 80,000 tons of aluminium per year and will eventually be doubled. British Aluminium has other interests which are widely spread throughout the world in Norway, Australia, West Africa and elsewhere. Its subsidiary, the Gold Coast Bauxite Company, is exploiting bauxite reserves in the Western region of Ghana and a 10 per cent stake is held in FRIA, the international consortium which mines and processes bauxite in Guinea. Though responsible for only some 3 per cent of the world output of primary metal, British Aluminium is thus a highly integrated company with a breadth of operations rendering it an acknowledged leader in its field. It represents the U.K.'s largest investment in this strategically important metal and it could become a substantial dollar earner.

The international stature of this British company is underlined by what appears to be a battle between two of the major U.S. aluminium producers to secure a high stake in the equity. The proposal put forward by the board is for Alcoa to subscribe for the £4,500,000 unissued Ordinary capital, thereby acquiring a one-third stake in the company which would put effective con-

trol in U.S. hands, besides giving the American company the sales organization in Britain which it at present lacks. Alcoa disclaims any desire to control British Aluminium, but as the major source of finance for future needs, it would have a considerable say in calling the tune, whatever the composition of the board. Moreover, it seems obvious that as Alcoa put more capital into the business, its proportion of the equity would increase.

The other plan is for Tube Investments, in association with Reynolds Metals, to make a cash and share exchange offer for British Aluminium's £9,000,000 issued equity. In all, this offer would be worth over £35,000,000. In September last year Reynolds acquired a half-share in the aluminium division of Tube Investment, which accounts for nearly 10 per cent of the U.K.'s output of fabricated products. The proposal is that the shares acquired by T.I. should be vested in a British holding company, of which the equity would be held as to 51 per cent by T.I. and 49 per cent by Reynolds Metals.

Both plans reflect the confidence of the major U.S. producers in the future of the aluminium industry, for which immense opportunities for expansion are foreseen. Quite apart from the question of whether control of British Aluminium is to remain on this side of the Atlantic, it must be a matter for regret that we are compelled to look outside the United Kingdom for capital to finance the expansion of undertakings launched and established by British enterprise. In the case of the South West Africa Co., this unfortunate necessity was avoided at the eleventh hour, but it looks as though, whatever the outcome of the present battle, American capital is destined to play a major part in the development of our aluminium industry.

In this context it is also relevant to consider the possible consequences for the Commonwealth Aluminium Corporation of the Americanization of British Aluminium. Although Consolidated Zinc is the prime mover in this project to exploit the vast bauxite deposits of Cape York and the Gulf of Carpentaria, British Aluminium has certain contingent options which could, initially at least, give it a considerable stake in the Corporation.

We are not among those who advocate government action to ensure that control of British companies is kept in British hands. American capital has made—and is making—a significant and generally welcome contribution to industrial expansion in this country. Conversely, there are important undertakings in the United States and other foreign countries which are British-owned; notably the Borax and Chemical Corporation, which is the world's largest producer of boron raw material. The Treasury's refusal to sanction a proposal for American investment in Britain on nationalistic or purely financial grounds would be a dangerous move which, in the long-term, might well do far more harm than good.

The remedy lies not in restrictions which are neither justifiable nor wise, but rather in positive measures to encourage the flow of British capital into our key industries among which must certainly be included the overseas mining industry. Experience has shown that, even in a period of dear money and credit restrictions, risk capital can still be forthcoming on a substantial scale, but with so many openings for their money, private investors in this country are in a position to be increasingly selective.

With our limited domestic resources of raw materials we, least of all manufacturing countries, can afford to rely on increasing injections of foreign capital to develop and exploit the immense reserves of metals and minerals in the Commonwealth. Unless we can continue to exercise control over the destinations of these precious resources, our continued prosperity in a metal-hungry world must be threatened.

THIS IS IT!

This past year has seen the stockpiling of coal in every country in Western Europe and the measures taken to cut-back production have ranged from compulsory "holiday shifts" to the closure of pits. In Britain the axe has finally fallen and on Wednesday plans were announced for the premature closure of 36 pits in the U.K. within the next twelve months over and above the normal programme. This is the final stage in a gradual cutting back process which started some months ago with the National Coal Board clamping down on overtime and recruitment. This has so far resulted in an output drop of 9,000,000 tons and a fall in the labour force of 20,000 men. Despite these measures, supply has continued to outstrip demand and stocks have mounted until no less than 19,000,000 tons of unsold coal are held by the Board at the pitheads. This is in addition to 18,000,000 tons of distributed stocks. Clearly there is a limit to stockpiling and this limit has been reached. Over £70,000,000 of the Board's capital is tied up in pithead stocks. Even a State undertaking cannot afford to have £70,000,000 sterilized, and this week the Board has had to ask the government for an extra £55,000,000 to see it through the year.

There is, of course, another very obvious disadvantage to stockpiling on this scale. Laying down and picking up coal is a costly process and, plus the additional fire hazard precautions necessary when storing coal in bulk, the total cost of stockpiling adds many millions of pounds to the total bill. Paradoxically, the only side of the Board's activities which can boast a healthy profit is also scheduled for trimming. No doubt yielding to pressure from the National Union of Mineworkers, the Board has decided to cut back opencast production by 25 per cent, approximately 3,000,000 tons per annum. This singularly unbusinesslike gesture will cost the Board £3,000,000 next year.

The 36 pits to be closed are relatively small ones and together they have an output of just under 3,000,000 tons. They have been running at a loss for some considerable time, and between them last year cost the Board £4,000,000. There must still, however, be many pits in the red, and it is strange that opencast operations are to be sacrificed first.

If drastic economies are indeed necessary—and no one disputes this—a better line of attack might well have been a reappraisal of the large-scale face mechanization projects throughout the thousand-odd mines of the industry. Whilst accepting that from a mechanical standpoint the shovel is one of mining's most inefficient appliances, nevertheless in the hands of a good workman it is selective. This, however, cannot be said of much of the machinery installed to do the job of the shovel.

Stone and coal come alike to power-loading equipment and the final product often needs considerable treatment to sort the good from the bad. Last year 30,000,000 tons of dirt made its way up British shafts out of a total of 250,000,000 tons raised and weighed. This dead tonnage represents a considerable sum of money wasted in haulage and hoisting charges and in addition ties up a lot of money in the subsequent cleaning processes. Assuming that the hand-filler can still be relied upon to distinguish coal from dirt when working underground, and to act accordingly, it would appear that a very considerable part of the 55,000,000 tons of power-loaded output last year consisted of dirt. What was the eventual cost per ton of the saleable coal in this tonnage?

Apparently it is not universally accepted that output per man shift is not necessarily the yardstick by which performance should be measured today. This may have been so while it was a question of maximizing coal production

at any cost, but now that coal must sell competitively, a much better criterion is profit per ton. It is of no avail if the introduction of a power-loading machine saves 1s. per ton on the face but necessitates a subsequent additional expenditure of 1s. 6d. per ton in cleaning and treatment costs. In such a case, the fact that the machine produces more tons merely increases the total loss.

Aside from the high dirt content of coal from power-loaded faces, we must also consider the effect of degradation. Many of the very large mechanical units on coal faces are producing an abnormally high proportion of small coal. Apart from special coals where size is of no importance, such, for example, as those coals particularly suitable for coking purposes, the general tendency is towards big prices for big coal. The coal now embarrassing the N.C.B. is small and much must be there as a result of power-loading. It would appear that the Board has a choice if it is to reduce its surplus smalls; either it must use machines underground to give the consumer an acceptable product or, alternatively, it must take the unacceptable product and then work on it and make it acceptable.

Not so long ago the oil industry had a somewhat similar problem. The oil companies were faced with the prospect of being left with unsaleable fractions after refining. This not being to their liking, the oil industry got down to large-scale research and developed a virtually new industry, the petro-chemical industry. This is devoted almost entirely to producing saleable products from otherwise waste material. Admittedly the N.C.B. maintains research establishments, but is sufficient money and effort being spent effectively on research into the utilization of small coal? Are plans being made—sufficiently wide in scope—to effectively increase the capacity of manufactured fuel plants and to give a product sufficiently competitive to bear comparison with non-solid fuels? Last year less than 2,000,000 tons of manufactured fuels were produced by the Board's plants despite the fact that demand for this type of fuel was high and could be even higher. In the present situation, is this good enough?

There is no doubt that competition from alternative fuels is going to be much more intense in the next few years and the Board must plan accordingly if it is to meet this competition. In the United States the coal industry was badly hit by loss of markets to oil and gas and was only saved by a fuel famine in Western Europe which siphoned off its excess production. Even in Britain there has been evidence for many years that fuel fashions are changing. Whether it is desirable to place more and more reliance on imported fuels is, of course, another matter, but in the absence of import restrictions—always distasteful—this changing pattern requires a considerable change of tactics by the Board. The British coal industry has got to produce in sufficient quantities at the right prices and of the right qualities if it is to sell all its products. Even the gas coal market is threatened. If pilot stage plants prove successful—and work is already progressing—a substantial part of Britain's need for gas could be met by massive importations of refrigerated natural gas, which on a calorific value basis could sell at prices much below those obtaining for manufactured gas.

Although it is obvious that the greater part of Britain's energy needs must continue to be met by coal for many years to come, the impact of competitive fuels—at present just a nudge—has been sufficient to jolt the industry into a belated awareness of its predicament. The next decade may not be so easy as the last, for there is all the difference in the world between a shortage of a few million tons and a surplus of the same order. The Board has yet to prove itself on a buyers' market, but before now other major mining industries have successfully measured up to the challenge of substitution.

URANIUM PRODUCTION IN AUSTRALIA

White's and Dyson's orebodies at the Rum Jungle uranium mine, in the Northern Territory, have cut out, and work on them has ceased. The mine is being operated by Territory Enterprises Pty. Ltd. for the Commonwealth Government. Commenting on this, our correspondent reports that treatment will not be affected; open-cut mining on a large scale was carried out by Wimpeys Ltd. and there is a stockpile of ore resulting containing 372,800 tons, sufficient to keep the mill running at full capacity for 3½ years. The limits of the two ore deposits had been foreseen for some considerable time and active search for new occurrences carried out. This work has resulted in an announcement that diamond drilling has located a new deposit of uranium ore, the extent of which must be determined by further drilling. However, it is stated that first indications suggest high-grade ore.

A new producer in the coming year will be South Alligator Uranium N.L. which has completed arrangements with the United Kingdom Atomic Energy Authority for the sale of uranium oxide to the value of £A1,150,000. A small treatment plant is to be erected and the finance for this work has been arranged, so that construction will be commenced immediately. Ore reserves in the company's mine are estimated at 10,000 tons with an assay value of 1 per cent uranium oxide. It is expected that extensions of the deposit will add to the ore reserves.

MINERAL DISCOVERIES IN MEXICO

Recent major discoveries of metal deposits in Mexico are expected to give a boost to the mining industry. Guillermo Aguilar y Macia, head of the National Resources Council, has issued a report on recent exploratory progress.

A rich copper mine has been discovered in the La Verde zone of Michoacan, in the basin of the Balsas and Tepalcatepec rivers. The proved mining zone, according to the National Resources Council, has a surface area of approximately 25,000 m. and a depth of 30 m. Proved tonnage in the area so far explored comes to 22,500,000 tonnes, with a copper content ranging from 1.8 to 12.9 per tonne.

Apart from the vast copper deposits discovered in Michoacan, a heavy deposit of anthracite has been found in Sonora: the first to be discovered in the western Mexican watershed. These deposits will be used to supply metallurgical industries along the Pacific Coast, with correlated plans calling for establishment of new plants.

Huge coal deposits have also been found approximately 312 miles from Monclova (Coahuila), the reserves being estimated at 500,000,000 tonnes, or sufficient to satisfy future demands of the steel industry and the nation for the next century and a half. The area of this new coal find is 510 sq. km.

In the search for new coal deposits, to assure steady progress of the steel industry, the Council is drilling two exploratory soundings in the Monclova basin, to the south of the Adjuntas Basin, where the first major find was made. This new area covers 200 sq. km. and expectations are that a new discovery will result.

It is further reported that Mexico is planning to refine zinc by the electrolytic process in a plant to be established in the industrial city of Irapuato, in the state of Guanajuato. An investment of $10,000,000 will make it possible to produce 25,000 tons of refined zinc, according to a Council Survey. Another project is to catalogue all mining properties.

Critical Times for Bolivia

AMONG the countries most severely hit by the restrictions currently affecting base metal exporters is Bolivia, whose economy is in a precarious condition.

On August 18, President Siles reconstituted his Cabinet and announced the new Government's firm intention of upholding the policy of modern stabilization. Hopes were shattered, however, by the temporary collapse of tin prices on September 18 and by the imposition shortly afterwards of the U.S. import restrictions on lead and zinc, both of which events caused bitterness and consternation. A mission from the International Monetary Fund, which had arrived in La Paz to study Bolivia's deteriorating financial position, insisted on the suspension of all foreign exchange operations by the Central Bank, pending the adoption of measures to meet the new crisis. On October 1, exchange operations were resumed at a new rate of Bolivianos 11,000 to the U.S. dollar, a tax of 2 per cent on all sales of foreign exchange was introduced, and some economies in government foreign expenditure were announced.

Fluctuations of Goodwill

The effect of the drop in tin prices on September 18—for which the blame is laid on Russia's policy of economic aggression—was mitigated to some extent by the announcement, on the same day, that American aid to Bolivia of $U.S.26,000,000 had been approved for the period July, 1958, to July, 1959, and that a further unspecified sum might be made available from the Development Loan Fund, in the shape of credits to finance approved projects which would lead to increased national production.

Any goodwill which the United States might have gained from this timely assistance was dispelled by President Eisenhower's announcement on September 22 of a 20 per cent reduction in U.S. imports of lead and zinc. This measure led to vigorous protests in both Houses of the Bolivian Congress, in the mining industry, and in the National Press. Complaints were also made that the lead quota of 2,523 tons per quarter assigned to Bolivia had been incorrectly calculated. It was contended that, on the basis of 80 per cent of her actual exports in the years 1953-1957, Bolivia should have a quarterly quota of 4,580 tons, and that the loss in foreign exchange resulting from this mistake would run to several million dollars per annum. The restrictions will certainly cause grave hardships to the small private mines, whose output normally accounts for some 70 per cent of Bolivia's lead exports.

At the end of September, it was reported that the National Commission for the Study of Mining Operations, a body formed by leaders of the large, average and small nationalized mines, had suggested to the Minister of Mines that, in view of the critical situation of the mining industry and the country's finances, the payment of compensation to the former owners of the nationalized mines should be suspended until conditions improved. The Commission also has suggested to the Foreign Ministry that a formal petition be sent to the U.S. State Department asking the U.S. Government to increase the quarterly quota of 2,520 s.tons allocated to Bolivia under recent U.S. import restrictions.

The situation of the State Mining Corporation remains critical. In rejecting a petition submitted in August by the Federation of Mineworkers for higher wages and better conditions, the corporation pointed out that many mines were losing large sums of money every month in uneconomic operations, that it had accumulated enormous debts, that the fall in world mineral prices had gravely affected the industry's earnings, and that in spite of the dismissal of some 7,000 workers since December, 1956, a labour force in excess of present needs had still to be maintained.

Strikes or labour disturbances at San Jose, Pulacayo, Catavi, and Siglo XX mines added to the corporation's problems. Although these were eventually ended, it was not without the granting of further concessions to the instigators of the troubles.

One of the measures reported to be under consideration by the corporation is handing over the San Jose mine (currently losing more than $U.S.90,000 a month) to a co-operative to be formed by the mine's trade union. The corporation stated in August that it intended to shut down its Kami wolfram mine, which is also incurring considerable losses, but at the end of September this mine was still functioning. There is strong opposition to the closing of mines from the mineworkers' unions.

The medium and small private mines have also been seeking to solve their problems. They have requested the government to allow them freedom to engage and dismiss workers and to reduce their contributions payable to the State social security scheme, at the same time cancelling all outstanding contributions. The medium mines have also asked that the deduction of 12½ per cent from the proceeds of their tin sales in respect of repayments on the tin buffer stock loan should cease. They contend that this is an unjust burden on their finances, since no similar deductions are made in the case of the small private mines.

Credits to Private Mines

The Ford, Bacon and Davis Mining Mission states that numerous applications have been made by private mines for the granting of credits under the Point IV Supervised Credits Scheme. The mission announced in August that it had already recommended loans totalling Bs.1,866,000,000 to three mines and that the merits of applications from forty-nine other mines for a total sum of $U.S.494,000 and Bs.8,917,000,000 were being examined.

Continued efforts are being made to develop Bolivia's gold and silver production, and to switch as many surplus workers as possible to the mining of these products. Encouraging results have been reported from the gold producing Tipuani region and geological studies have been carried out in the Lipez provinces of Potosi, where silver was mined in Spanish colonial times. A mass meeting held by the citizens of Oruro on September 28 urged the government to abandon tin production in their district in favour of silver mining.

On September 20, it was reported that the first electrolytic tin refinery in Latin America capable of refining Bolivian low-grade mineral had been inaugurated in Volta Redonda, Brazil, bringing the tin refining capacity of Brazil up to 6,000 tons per annum. So long as tin exports continue to be restricted by the International Tin Council, however, the Brazilian refinery is unlikely to be of much benefit to Bolivian producers.

Raw Materials and Chemicals For Metallurgical Processes

By C. C. DOWNIE

NUMEROUS raw materials for both wet and dry metallurgical processes have seen considerable improvements in their production methods of recent years, for their multifarious applications in extraction and refining methods. At the outset, graphite and carbon electrodes represent important accessories for both electro-thermic and wet electro-refining systems, and which are made in a profusion of variety where current can be economically obtained.

What is claimed to be the largest factory in the world for producing these items has one department devoted to mills for preparing the different compositions of coke, petroleum coke, anthracite, and soft and hard pitch, while the earlier use of lampblack and waterglass now appears to be relegated to special products.

Large extrusion presses, corresponding to what are engaged in tube-mills, extrude the black mass in the form of stiff material to rod form. This requires slow drying and baking before passing to a rather coarse form of horizontal electric furnace, built directly on the floor. Both amorphous carbon and graphite electrodes (accompanied by pieces of coke) are handled by the same system, as also are graphite blocks for electrolytic processes. The lengthy period of two and three months initially required for finishing carbon and graphite electrodes respectively has been materially cut, while for smaller units for welding purposes, etc., an automatic furnace elsewhere now makes them on the more or less continuous principle.

Despite various researches which have been undertaken, it appears to be impossible to make electrodes exactly to size, and after graphitizing it is frequently necessary to machine them to precise dimensions, and for which reason they are originally purposely made slightly oversize. The lengthy duration of the heating introduces low efficiency seldom exceeding some 30 per cent, and while current consumption has been quoted at 0.45 kWh. per lb., the actual figure is probably much higher in regular practice. There is still some speculation as to which electrodes are best suited for particular purposes, although the makers give concerns the benefit of their research department results. The graphite electrode is generally conceded to be best for wet electro-refining processes, as it is not so susceptible to oxidation in the electrolyte as is the carbon electrode. On the other hand, makers of many ferro-alloys prefer carbon electrodes with the exception of ferro-vanadium production, where graphite electrodes are substituted.[1]

Carborundum, Fused Alumina, and Carbon Disulphide

In an associated works, carborundum is prepared in all its forms, and the initial treatment here comprises thoroughly mixing the dry constituents, which normally consist of 57 per cent sand, 31 per cent coke, 7 per cent selected sawdust, and 5 per cent common salt. Apart from this, a further addition of coke is made to the charge in order to accord further conductivity to the mass. The sawdust provides the desired porosity and the chlorine of the salt, at high temperatures, removes iron, aluminium, and other impurities in the sand, which is otherwise the best grade of silver sand, upwards of 99.5 per cent purity. A battery of ten large electric furnaces upwards of 30 ft. in length are engaged (and of 3,000 h.p.), while current consumption is upwards of 4 kWh. per lb. When finished, the top waste is knocked off and the interior material broken up. This takes the form of bluish or greenish crystals in loose and lump state. Some of the fine material is used over again, while the lumps are removed by car, and all attendants, besides furnace operators, require to use mouth-shields to keep out the fine grit.

Fused alumina products such as aloxite, etc., are made in the same factory, and the material is obtained as white lumps with a loose sandy mass on the surface. As distinct from the former process, however, the material here when molten is tapped and, as with the former commodity, requires the use of special mills for reductions, as the earlier use of ball-mills is now discontinued. Both products are employed for different metallurgical processes, but the carborundum is also utilized for making electrodes for a range of electric hearths engaged for the production of non-ferrous metals, rare metals, and some ferro-alloys. The final cutting of these exceedingly hard electrodes to size requires the use of select ferro-alloy tools, revolved at limited speeds, to acquire the best results.

Amongst various tests, the finished electrode is subjected to a fixed number of blows from an electric hammer to ensure that the results of this correspond with the hardness and grain size, etc.[2]

The electric furnace initially introduced by Dr. E. R. Taylor for making carbon disulphide, used in the production of cyanides, sulphur removal, and certain rare metal processes, does not appear to have been improved upon to the present day. To all intents and purposes, the layout resembles a small blast-furnace, with carbon electrodes located towards the bottom. Sulphur enters through channels below these electrodes and charcoal enters at the top, using a charging system corresponding to that of an ordinary blast-furnace.

Gaseous carbon disulphide passes off to a condensing layout, and this product is re-distilled to remove sulphur and hydrogen sulphide, and provide the pure material. The furnace is operated by one attendant, occupies but little space, and requires little attention, but a motor generator of 500 kWh. appears to be preferred for supplying two-phase current to produce 1 lb. of material at an expenditure of approximately 0.5 kWh. This process is claimed to supply the whole of North America with carbon disulphide, while a somewhat similar process is used for phosphorus production.[3]

Sodium Chloride, Chlorine, Alkali, Hypochlorite, and Applications

The uses of sodium chloride or common salt in both wet and dry metallurgical processes, let alone chemical activities, are too numerous to mention. It is recovered from brine pumped up from salt deposits which are some 200 ft. in width, as carried out on a large scale, and uses a somewhat unique form of concentration in that the re-

covered solutions are merely kept warm, but not boiled. The initial concentration of the solution partly accounts for the success of this system, and the evaporating units simply comprise open pans heated by steam pipe-lines. There is always sufficient alkali surplus to prevent corrosion, and no further additions are normally made.

The process is so worked that one pump supplies water to the deposit and a second one draws up the strong brine solution, and the solidified material is then pushed out from the pans by slow-working rams. The very light, fluffy product so obtained is such that only 2 cwt. would fill a 50 gal. barrel. For making cube salt, three triple-effect vacuum evaporators, using 18, 24, and 28 in. vacuum, are used, and the solid salt is dropped to a shaker. A select form of conveyor pushes the still damp salt around corners to deliver it exactly as required—a feature which in earlier years introduced practical troubles to different chloridizing systems. (In one extreme instance of a wet extraction process, so many troubles had been experienced with the inaccurate addition of damp salt that the whole handling layout was dismantled and abandoned, because of the inability to control accurately additions made to the furnaces.) The salt drops through vibratory screens to a conveyor belt, to be dumped in heaps, and where a blast of air from a furnace impinges upon it to dry it, when the material then passes to the marketing department.[4]

The Alkali-Chlorine Cell

The alkali-chlorine cell for producing sodium hydrate and chlorine gas has been developed to an elaborate extent where large electric current supplies are directly at hand. Many hundreds of cells are linked up with this supply and fed continuously with saturated brine solution, which has been initially treated with soda ash to precipitate lime and magnesia salts, etc. This solution is directly run through a sand filter bed to remove solids which otherwise would clog the asbestos diaphragm of the cells.

A temperature of about 90 deg. C. is maintained in this electrolyte by use of a suitable resistance medium. The cells are made from perforated steel drums, with asbestos paper packed tightly upon them, using asbestos cement at top and bottom, while a float with frosted glass fitting ensures the liquid level being maintained inside the cell. The hot brine is electrolyzed as it reaches the perforated drum through the asbestos, and the sodium so separated dissolves in the liquor to form sodium hydrate. Because of the conditions of the construction chlorine cannot escape except through the central channel, while hydrogen passes from the outer channel, using suction fans to draw off the gases. In some cases the hydrogen is allowed to escape, since when out of contact with sunlight and the associated chlorine, it is not dangerous. The chlorine comes off at some 2 lb. per sq. in. pressure, and is utilized for making various chlorates, bleaching powder, etc., while surplus gas is bottled.

Each cell produces about 75 lb. of soda per day, which is recovered from the evaporated electrolyte, and which still contains the remainder of the undecomposed sodium chloride, while chlorine is obtained at an expenditure of approximately 3kWh. per lb.[5]

An entirely different type of cell is engaged for the production of sodium hypochlorite. Strange as it may appear, chemical firms in the United States do not as a rule supply this commodity directly, and prefer to have it marketed by small firms, to whom they supply bottles of chlorine and sodium hydrate. The electrolytic process, however, is a boon to those wet metallurgical concerns who utilize the hypochlorite, as the process functions night and day continuously without requiring attention. Pure sodium chloride liquor is caused to run from an overhead tank to enclosed cells provided with a set of carbon electrodes, whereby the chlorine formed is absorbed in the sodium hydrate simultaneously produced to form sodium hypochlorite, together with some undecomposed sodium chloride.[6] (The precipitation of cobalt by this reagent is carried out on a large scale in place of the bleaching powder earlier used, but requires to be applied with great precision, while it is also utilized in a number of other wet metallurgical processes.)

In recovering tin from tinplate, now available in greatly diminished quantity, one of the most scientific cyclic processes invented comprised drawing off the tin in an electrolytic bath and then reversing the current, regenerating the electrolyte, and depositing the tin on tin cathodes. Except where current could be obtained very economically, this system did not pay, and had to be relegated as of purely academic interest. On the other hand, the stripping of tin from tinplate by direct application of dry chlorine gas is still carried out industrially on an enormous scale elsewhere. This can be gathered from the fact that truckloads of select collected tin-cans are dumped into extensive chambers wherein this chlorine is applied.

The remaining de-tinned cans are removed and compressed in large baling presses and transported directly to the steelworks, i.e. after washing free from remnants of chlorides, while the tin chloride is disposed of.[7]

Hydrogen and Oxygen Production

In the production of a wide range of rare and precious metals the ultimate treatment comprises reduction with hydrogen to the metallic state. Smaller concerns purchase the familiar cylinder or bottle of gas, but where the work is carried out on a larger scale in a more or less continuous manner, it is frequently more expeditious to make gas on the spot, and particularly where oxygen can also be utilized. Electrolytic cells for decomposing water are available for this purpose, function continuously, and the only labour required is for periodically filling up the cups with distilled water. The cells are of nickel-plated steel to ensure freedom from corrosion with rubber glands at the top, which latter represents the only part which requires replacement, while the enclosed asbestos diaphragm lasts for years. A small addition of potassium hydrate is initially included in the water which lasts indefinitely, and the diaphragm keeps the gases separate as they are evolved. The capacity per hour at 600 amp. is 9.6 cu. ft. of hydrogen and 4.8 cu. ft. of oxygen. The cell is made up of three compartments, hydrogen being generated in the central section and oxygen at the two outer compartments, both at 99.8 per cent purity, while the water level is maintained the same in each of these. The gases come off at some 6 lb. per sq. in. pressure and pass directly to small gasholders, to be tapped off at pressures as required. Where direct current is available, it is possible to link up the cells without the need for devices such as transformers, generators, etc.[8]

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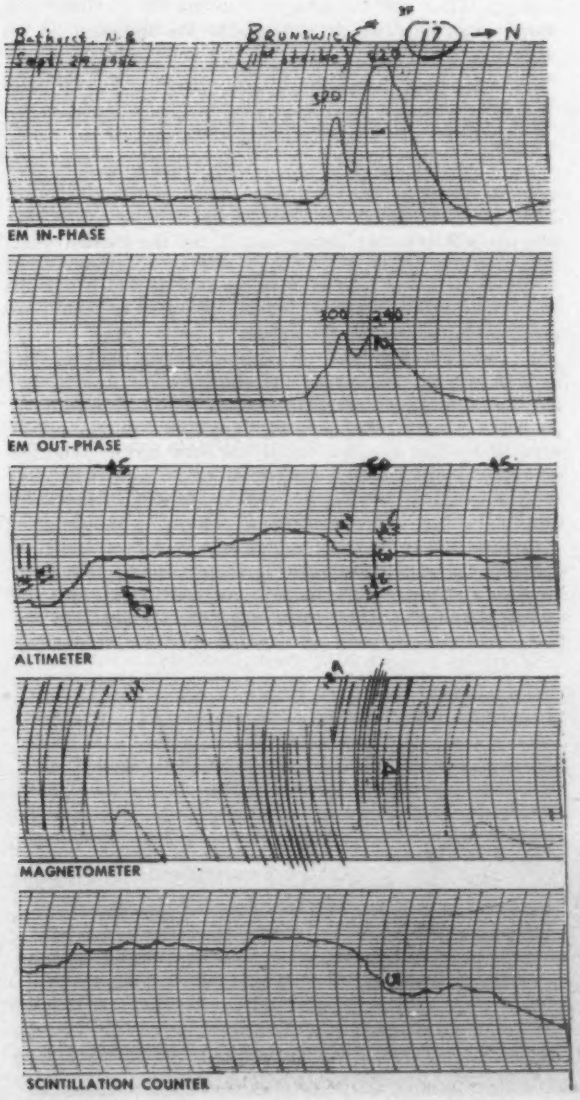
(1) Acheson Graphite Corp. (Union Carbide), Niagara, N.Y.
(2) Carborundum Co. (Union Carbide), Niagara, N.Y.
(3) Taylor Chemical Corp., Phillipsburg, N.J.
(4) Chemical Industries, Windsor, Ontario.
(5) Niagara Alkali Co., Niagara, N.Y.
(6) Everson Co., Chicago, Ill.
(7) Vulcan Detinning Co., Sewaren, N.J.
(8) Gas Industries Co., Pittsburgh, Pa.

Detailed Low Level Prospecting



DATA obtained from helicopter-borne instrumentation have been issued by Canadian Aero Services Ltd. in a brochure entitled "Detailed Low Level Prospecting Over Any Terrain". All the profiles contained in this brochure are true photographic reproductions of the original results obtained in the field by the Newmont Mining Corporation during September, 1956, when they were conducting tests with EM equipment over known orebodies in New Brunswick.

Performance Characteristics

An important advantage claimed for the Newmont-Canadian Aero system to the mining industry is that it measures dependably the true in-phase component. The system can feed the total magnetic field intensity into two recorders. One is the Brush recorder, where the magnetic data are noted on one of six channels for quick correlation with the EM results. The other instrument is a Leeds and Northrup or Gulf 10 in. rectilinear recorder. Compilation of the magnetic data in a contoured plan map can be done, therefore, with an accuracy equal to any purely magnetic survey.

The ratio of the in-phase response to the quadrature response gives the interpreter a valid indication of the relative conductivity of the anomalous zone. Because of this ratio, it is often easy to discriminate between conductors of different characteristics. For example, experience with the Newmont/Canadian Aero unit in northern New Brunswick has shown that it is relatively easy to separate graphitic zones from massive sulphide orebodies. Graphites in this particular area are less conductive than massive sulphides, and the quadrature response was observed to be very marked over the graphites and massive sulphides. However, the in-phase response was zero over the graphites and very pronounced over the massive sulphides.

In addition to this discrimination between conductors, with this system other useful quantitative information can be determined—such as the depth and width of conductors. Because the system measures directly the change in the primary field, caused by varying conductivities in the ground, its data can sometimes add valuable information concerning the structural and lithological nature of the survey area.

The Electro-Magnetic Detector

Measurement of the in-phase and out-of-phase (quadrature) responses is made at a frequency of 390 cycles per second. The amplitude of response is calibrated in parts per million of the primary field.

Vertical coaxial coils are used for the EM system. They are mounted on booms fore and aft on the S-55 helicopter. Actual separation between these transmitting and receiving coils is 60 ft. This rigid coaxial system, with the axis of the coils parallel to the direction of flight, provides maximum response when the aircraft crosses the strike of the body.

This airborne unit may be used to supplement reconnaissance surveys with accurate, low level, detailed work in the air or to obtain blanket coverage of small areas, regardless of rugged or mountainous terrain.

Generally the airborne survey attack on a target area is governed by the following considerations:

(*a*) The logistics: location of area, square miles to be covered, availability of gasoline and supplies, time allotted.

(*b*) Amount of information known about target area: geology, available magnetic data, probable mineral occurrences, probable favourable host rocks, other pertinent data.

Over an area of considerable size, where little is known about the structure and geology, it may be advisable to survey first with the airborne magnetometer in a fixed-wing aircraft. Rough data reduction and interpretation can be done in the field, and selected areas designated by the geophysicist for intensive helicopter surveys. For detailed surveys, traverses are flown usually at ⅛ or ¼ mile intervals, with the minimum practical terrain clearance.

The profile here reproduced was obtained from a traverse over the Brunswick Mining and Smelting No. 6 "Brunswick" orebody. This orebody is a massive sulphide replacement, 1,100 ft. long, with a maximum width of about 300 ft. It is covered by 5 to 20 ft. of overburden. The orebody dips to the west at 60 deg. slant and lies along the northern edge of a quartz-feldspar porphyry body.

Profile A (not reproduced) was obtained from a traverse which crossed the orebody at a terrain clearance of 135 ft. The following were points of particular interest:

(*a*) The strong response of the in-phase component, and the less intense but clearly indicated out-of-phase response.

(*b*) The ratio

$$\frac{\text{in-phase response}}{\text{out-of-phase response}} = \frac{550 \text{ p.p.m.}}{150 \text{ p.p.m.}} = 3.66$$

(*c*) The negative in-phase deflection over the iron formation, strongly indicated on the magnetic trace.

Profile B (reproduced) was flown parallel to the strike of the orebody. Because of the good resolution of the EM unit, it is possible to discriminate between the two separate masses of ore which immediately underlie the overburden.

Canada's Sub-arctic Nickel Mine

NORTH RANKIN NICKEL MINES LTD., Canada's most northerly nickel-copper operation, has been working round the clock to ship out as much nickel as possible before the end of the summer. The shipping season only lasts for about six weeks, so that for ten and a half months of the year all ore mined has to be stockpiled.

The company's property is situated at Rankin Inlet, North-Western Territories, on the west shore of Hudson's Bay, some 320 miles north of Fort Churchill. During the winter the ground is frozen solid to a depth of several hundred feet.

By the end of the summer shipping season, 2,197 s.tons of nickel and 510 s.tons of copper contained in concentrates had been shipped, earlier estimates thus being substantially exceeded. The first shipment of concentrates left the property in mid-August, and six other shipments were scheduled before the closing of the season in mid-October. Their destination is the Sherritt-Gordon refinery at Fort Saskatchewan. An additional 430 s.tons of nickel and 89 s.tons of copper in concentrates was left on the property because the eighth and last ship could not take its cargo out owing to the closing of port facilities in Churchill. Mill heads have been running much better than anticipated, averaging 5.5 per cent nickel, but are to be reduced to about 4 per cent.

North Rankin is embarking on a reorganized production programme which will enable the shipment of an estimated 2,895 s.tons of nickel and 650 s.tons of copper contained in concentrates to be shipped next summer. The mill rate is to be raised from 215-220 t.p.d. to 240-250 t.p.d. and it is hoped to produce about 250 s.tons of nickel monthly.

Although the contract under which the Rankin output was purchased by Sherritt-Gordon envisaged only 2,000 to 2,250 s.tons of nickel this year, it has been reported that Sherritt will take the entire output for the current year, and also that it is prepared to treat concentrates from North Rankin for another year, at a price which has yet to be agreed. This year Sherritt is paying 35 c. per lb. for nickel and 10 c. per lb. for copper.

To reduce freight costs on perishables and the transport of staff to and from Fort Churchill, North Rankin has purchased an Anson aeroplane, which will also be used for geophysical work. An extensive exploration programme is planned for this autumn, and it has been further reported that additional diamond drilling is to be undertaken on the easterly extension of the Rankin orebody to check its continuity.

Eskimo labour is used exclusively in North Rankin's operation. The company has, in fact, been given a grant by the Canadian Government to teach the Eskimos modern methods. They learn very quickly and are reported to have a natural aptitude for anything mechanical.

Loading nickel-copper ore at Rankin Inlet on the west coast of Hudson's Bay. The shipping season lasts for only about six weeks of the year, so that throughout the other ten and a half months ore must be stockpiled. During winter, the ground is frozen solid to a depth of several hundreds of feet

NUCLEAR RAW MATERIALS—III

Uranium Prospecting in Portugal and France

PORTUGAL is one of the uranium producers that have not revealed output statistics. Whilst production data was not forthcoming at Geneva, the Portuguese did provide a detailed description of their exploration activities containing much interesting information on the relative efficiency and costs of different prospecting techniques. Systematic uranium exploration in Portugal has been carried out by the Junta de Energia Nuclear since June, 1955, and should be completed by the end of this year.

Uranium Prospecting in Portugal

Preliminary aerial radiometric survey of an area of 4,184 sq. kilometres was carried out, using a light aircraft equipped with recording scintillometer equipment, synchronized aerial photographic cameras and radioaltimeter. Flight-lines 400 metres apart normally orientated to the predominant mineralized structures were flown at an average height of 100 metres. Expenditure was 378.25 escudos per sq. kilometre covered. Because of the broken nature of the terrain the results of this survey were unsatisfactory and the method was abandoned in favour of car-borne radiometric survey using a scintillometer and high sensitivity Geiger-Muller counters together with appropriate alarm and recording equipment. As tight a grid as possible was maintained over a total area of 31,280 sq. kilometres in which many anomalies were detected often associated with exposed uraniferous mineralization.

The density of the itineraries made over different areas varied with the nature of the topography, and in some cases was clearly inadequate to evaluate the potential of the area. In other regions the work was most successful, and in some areas previously assumed to be barren autunite impregnations in schist were discovered using this technique. Photogeological interpretation was employed to accelerate the geological mapping of the prospecting zones. In this manner about 1,000 sq. km. per operator per month were mapped at a cost of 30 escudos/sq. km.

Geological mapping on a scale of 1/25,000 and general radiometric prospecting along a 1 km. grid were at first envisaged as independent operations, but it was quickly decided that it would be more economic to carry out both operations simultaneously. It was also found that whilst a 1 km. grid would suffice for geological mapping of the relatively uniform crystalline massif, it was quite inadequate to define the variations in structure governing possible uranium deposition. Since 1956 the two surveys have been carried out simultaneously on a grid of 200/300 m. In this manner 6,213 sq. km. have been geologically mapped and 6,453 sq. km. prospected radiometrically for uranium. About 0.5 to 1 sq. km. per operator-day were covered with an average expenditure of 583.7 escudos per sq. km., of which 233.48 escudos was accounted for by mapping and the balance for radiometric survey.

More detailed surveys of regional anomalies were made using high-sensitivity ratemeters in grids of 25 x 50 m. or by profiling along lines 25 to 50 m. apart with readings every 5 m. The areas covered per operator-month and the cost per sq. km. by these two methods were respectively 5-10 km.^{2} and 700 escudos, and 1 sq. km. and 4,550 escudos. Nearly 200 uranium occurrences discovered in these surveys were opened up by trenches up to 2 m. in depth. These were arranged normally to the isorad contours and allowed detailed geological and radiometric studies, sampling and analyses.

Geneva papers dealing with uranium resources and discoveries in various countries have been reviewed briefly in this series. The following article describes prospecting activities in Portugal and France.

If warranted, this work was followed by drilling on 30 to 40 m. centres arranged to intercept orebodies at 40 m., 80 m. and 120 m. depth, and each hole was radiometrically logged and the core sampled. Forty of the deposits trenched were selected for drilling.

Thereafter, if results justified it, normal mining exploratory work was carried out from shafts and galleries.

Diamond drilling commenced late in 1955 with three Craelius "XF" drills, and a further three of these drills were brought into operation in mid-1956. With an average of twelve drilling shifts a day, a monthly drilling rate of 12,000 m. was achieved. The average cost to date is 281.5 escudos/metre drilled.

Activities in France

Papers on the French uranium mining industry presented by members of the Commissariat à l'Energie Atomique were of uniform excellence. The locality of deposits of uranium in Metropolitan France are closely bound to tectonic structures, and the application of conventional geophysical techniques in the search for mineralized structures was the subject of an interesting French contribution.

Geochemical dispersions of uranium in natural waters and alluvial deposits are sufficient for them to be used to define the region favourable to the discovery of a deposit. Water in particular shows abnormal uranium content which can be detected several miles from a deposit. Fluorimetry makes it possible to reveal quantities of less than 1 microgram of uranium in a litre of water, the uranium being extracted using ion exchange resins before analysis. Hydrogeochemical survey must be carried out rapidly to avoid variations due to changes in climatic conditions obscuring the results, and to achieve this demands the existence of good communications. In France, specially equipped laboratory vehicles carry out on-the-spot analyses and permit the speedy monitoring of anomalies. In soil sampling, analyses are carried out in the field using a direct paper chromotography technique. An acceptable sensitivity of 4 p.p.m. is achieved using hexone as a solvent and alizarine as developer.

Geochemical studies of uranium ores were also described in a Spanish paper, which dealt with a technique for obtaining casts of uranium minerals for examination under the electron microscope. Spectrographic analyses and the study of geochemical associations have in certain instances permitted the identification of the type of vein from which the uranium discovered by hydrogeochemical surveys is derived.

Car-borne radiometric prospecting in France costs about 250 frs. per linear km., and is carried out using both Jeeps and Citroen cars.

The French have prospected 150,000 sq. km. from the air, much of this area being in the central Saharan region. Cessna aircraft equipped with scintillometers are used for preliminary reconnaissance and followed up by Piper Cubs or helicopters with more sensitive instruments. Costs are of the order of 3,500 frs. per sq. km.

Machinery and Equipment

Television Camera Monitors Mine Skips

Ore at the Jeffrey Mine of Canadian John Mansville at Asbestos, Quebec, is hoisted by two 12½-ton capacity aluminium skips, counterbalanced. When the loaded skip reaches the surface it empties, via its sliding door, into a bin. Simultaneously, the skip tender, who operates at the 940 level, loads ore into the alternate skip from a 12½-ton measuring pocket. This done, he sets the skips in motion.

When the moisture content of the asbestos ore is high, the ore, unknown to the skip tender, sometimes sticks in the dumping skip, thus preventing complete discharge. Moreover, the sliding skip doors sometimes jam and stay open after the ore is discharged.

If a skip in this condition is lowered, the result is either an overflow of ore, or the ore discharges through the open skip door, down the shaft. The spilled ore must then be mucked out of the spill pocket and hoisted in 2-ton cars. Cost is high, time is lost, and the shaft is sometimes damaged.

As a solution to the problem, a television apparatus was installed so that the skip tender might quickly spot improper door operation or hang-ups at the dumping station.

A television camera was set up 20 ft. in front of the two skip dumping areas, and a monitor was installed in front of the skip tender at this station on the 940 level. A 1,000-ft. coaxial cable connects the units. Adjustments are made from a monitor and camera control unit located in the lamp room at surface. By this means, the skip tender is now able to spot any irregularities in operation and prevent spills and damage. The device has been described in *Mining Engineering* Vol. 10 No. 8.

LOCATING RADIOACTIVE SOURCES

An entirely new instrument for locating radioactive sources applying the principle of radar has been developed in Japan and was the subject of one of the most stimulating contributions to the Second United Nations International Conference on the Peaceful Uses of Atomic Energy, held in Geneva, and which ended on September 13, 1958.

Basically, the instrument consists of a cylindrical scintillation crystal, around which rotates a U-shaped scanning collimator at 10 r.p.m. The collimated scintillometer is electromechanically linked with an electronical system for reproducing the results on a screen similar to the radar technique. The whole set weighs 160 kg. and consumes 500 W. power.

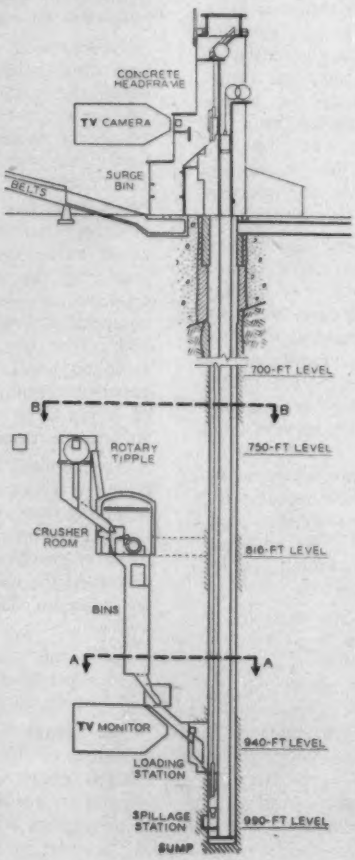
The U-scope has been proved in field surveys conducted last year in the Okayama and Tottori Prefectures of Japan and is found to give visible patterns in the direction from whence gamma rays emanate, and to permit the location of the source by intersection techniques, using two observing points. Each observation takes six seconds, is perfectly automatic and can be photographically recorded. Continuous observations from a car enable rapid location of the radioactive source. This instrument seems capable of revolutionizing radioactive survey techniques.

REMOTE CONTROL MINING

A mining system permitting men to mine coal without going underground has been announced in the United States.

Joy Manufacturing Co. and Union Carbide Corp., have jointly announced the signing of an agreement that gives Joy the right to manufacture, use, lease and sell a remotely controlled continuous mining system. This equipment was originally developed by Union Carbide Olefins Co., a division of Union Carbide Corp.

A vertical section through the No. 1 shaft, Jeffery Mine



The Peabody Coal Co. operated one of the early Carbide-built prototype machines for several months in three of their mines. Final commercial development of these machines is now being undertaken by Joy, on completion of which Peabody expects to place the first commercial machines in operation. This is expected to be in about 18 months.

The system is operated by a man at an electronic control centre actuating the mining machine which can penetrate high-wall coal to a depth of 1,000 ft. or more. It is believed that this system may be made applicable to underground deep mines in five to ten years.

This system includes a continuous mining machine equipped with sensing elements which electronically report to the operator outside the mine whether the machine is properly heading into coal. With this information the operator outside the mine electronically guides the course of the machine to follow the coal seam.

A prototype machine has proved capable of advancing an entry at a rate of more than 100 ft. in one hour.

The mining machine automatically loads coal on to a heavy-duty continuous transport system that follows the machine into the mine and delivers the coal to an outside discharge station. This especially rugged transportation system is designed to operate where local roof falls occur.

A NEW ROCK DRILL

The Atlas Copco "Tiger" rock drill, described briefly in our issue of November 7, 1958, weighs 60 lb. and is designed for high-speed drifting and stoping operations. It was introduced to the British market at the recent Public Works and Municipal Services Exhibition.

A driller can operate the "Tiger" and retractable leg with one hand. This has been achieved by incorporating in the back head the control valves for the rock drill and retractable leg. When the leg needs repositioning during drilling, a trigger, fitted into the handle of the back head, is pressed, automatically withdrawing the leg. The trigger is released when the leg is in the desired drilling position, retraction then stops and pressure returns. All this can be done while the drill is still operating.

The time taken for re-siting the drill is reduced, due to the efficiency and manoeuvrability of the BMT 50 leg. This has also increased the footage per man shift. The automatic back head design prevents dry collaring.

The "Tiger" is provided with constant blowing—which means that as soon as the pressure is turned on, air blows through the machine to prevent water and dirt from entering through the rotation chuck. Extra blowing is obtained by altering the position of the throttle in an anti-clockwise direction. Standard rotation is up-stroke.

Technical Briefs

Vermiculite Firewalls in Deep Mines

Vermiculite, a mineral extensively used in the building industry and also for horticulture, is now being used in the South African goldfields for the construction of firewalls in deep mines. These walls have not only to be fireproof and "kill" the blast of hot air or "stifle" the inrush of outside air to the fire, but they must also be of such light material that a fire-fighter, heavily encumbered with protective clothing, can build them rapidly.

So effective has vermiculite proved that the Transvaal and Orange Free State Chamber of Mines has issued a directive that emergency stores of vermiculite must always be carried at each mine. It has been used effectively, through outbreaks of fire at Van Dyk Consolidated, Rand Leases, East Rand Pty. Ltd., and City Deep mines.

The use was developed by the Chamber of Mines Services (Pty.) Ltd., more generally known as the Rescue Training Station—a division of the Transvaal and Orange Free State Chamber of Mines, with offices in Johannesburg. Until recently, all walls which the proto-men—as the South African rescue teams are termed—built to seal off fires were made with sandbags, bricks, and concrete blocks. Then loose vermiculite in hessian bags, vermiculite concrete blocks, and vermiculite plaster were tried out. The results were so successful that vermiculite is now being used in every mine.

The temporary fire seals are built at the closest possible point to the fire, the loose vermiculite being contained in hessian sacks which are normally fireproofed with ammonium phosphate. These bags, 24 in. x 15 in. x 9 in., are stacked across the passage, thereby creating a wall 2 ft. thick. The permanent walls are then built behind this temporary wall and vermiculite blocks 18 in. x 9 in. x 4½ in. are employed for this purpose. The passage of air is reduced to a minimum by the temporary seal and completely prevented by the permanent seal.

The special advantage of vermiculite is that it is light to transport and therefore the seals can be very quickly built. It will be easily appreciated that a proto-man heavily laden with protective clothing and breathing equipment crawling along narrow passages can far more readily transport 2 cu. ft. bags of vermiculite weighing about 9 lb. than ¼ cu. ft. sandbags weighing about 35 lb.

British mining authorities and the National Coal Board have been advised of the special virtues of vermiculite for lightweight firewalls. It is likely that some practical tests will be carried out in this country shortly.

DIMENSIONS OF FLOTATION CELLS

The dimensions of flotation cells have been discussed by W. Grunder (Z. Erjbergb, Metallhutten, May, 1958), who shows that flotation efficiency is primarily determined by the aeration, and air bubbles do not become saturated with floating mineral particles even in the tallest cells. The suspension effect of the impeller, which decreases with higher pulp density, particularly with coarse material, is seen to be not only dependent on peripheral speed, but also on the ratio of diameter of impeller to size of cell.

DETERMINATION OF BERYLLIUM

The spectrographic determination of beryllium in a variable matrix is described by E. E. Creitz in a paper published by the U.S. Department of the Interior as Bureau of Mines' *Report of Investigations*, 5407.

Application of the usual chemical methods to the determination of beryllium in the mineral dressing products of a spodumene pegmatite was found to be unsatisfactory as to speed, accuracy, sensitivity, and range of analysis. In the spectrographic method described by Creitz, samples are ground, mixed with borax, high purity flake graphite, and an internal standard. Then they are fused, reground, pelletized, and excited with a high-voltage spark discharge.

Several spectrographic techniques to overcome matrix effects were investigated. The method developed gives results for beryllium in the concentration range from 0.002 to 5 per cent, the average probable error of duplicate determinations was below 3 per cent of the quantity present.

FOAM FIGHTS COAL FIRES

Foaming substances similar to those employed in homes and industrial plants to remove grease and dirt have been used successfully in controlling certain fires in an experimental mine in Pennsylvania, according to reports from the U.S. Bureau of Mines. Nine fires have been started in the Bureau's experimental mine near Bruceton, Pa., to determine the effectiveness under American conditions of the foam plug technique originated in England. Six of these fires were controlled by the foam and three were not. Four different brands of foaming agents, some with stabilizing additives and some without, were used in the tests.

The Bureau's conclusions, given in a detailed report released last month, are that coal fires of "moderate size and intensity" can be controlled effectively by large masses of foam generated several hundred feet away. The Bureau is continuing tests to gain more information about the new method.

Bubble-making solutions containing the same chemicals as found in household and industrial detergents were used to produce foam plugs. Mixed with water and sprayed on a cotton screen or net stretched across a mine passage, the solutions formed large bubbles that quickly amassed into a huge plug of foam. The plugs were carried by the mine ventilating current to the fire zone, where the water in the foam vaporized, lowering the temperature, and subduing the flames.

The Bureau of Mines began its research on the foam plug method last year. The report indicates that the method has promise, especially as a means of controlling a fire long enough for men to move in close and extinguish it with water or other agents. Foam plug techniques were referred to in *The Mining Journal* of November 1, 1957, when it was stated that the Bruceton tests were to take place at a then indefinite period.

TREATMENT OF PHOSPHATE ROCKS

In the treatment of phosphate rock in the western United States by San Francisco Chemical Co. very considerable use is made of hydrocyclones for desliming before flotation. No less than three stages of desliming are employed, one before grinding to 28 mesh, another after grinding, and a third after treatment in Wemco attritioners.

The sand fraction is then sufficiently scrubbed and the surface of the phosphate polished to an extent which permits froth flotation. It is interesting to note, however, that conditioning is carried out in a horizontal drum with spiral flight lifters at a pulp density of around 80 per cent solids, and further similar conditioning precedes the scavenging stage.

Another interesting feature is the use of D.S.M. screens in closed circuit with the rod mill, which are said to possess a very high throughput. The undersize, however, is passed through Sweco vibrating screens, also with 28 mesh separation, to ensure a sharp separation at the size range most desirable for flotation.

RUBBER/METAL BONDING PROCESS

It is claimed that optically smooth precision rubber parts ground to dimensional tolerances usually expected only from metal can be achieved with a new system of bonding Hycar American rubber to metal parts.

The new system, called Permadizing was developed by Stillman Rubber Co. Rubber-to-metal bonded parts are said to be free of flash, precise in dimension, and have optically flat surfaces for effective sealing at almost zero pressure. The new bonding process can be used with almost any metal, and provides what amounts to a new material, a rubber-metal composite whose dimensions can be held as closely as all-metal parts. Rubber surfaces as fine as five microfinish are produced.

NEW CLASSIFICATIONS

A number of papers concerning the operation of hydrocyclones have appeared during the year, two of which deal with the internal kinematics. Toshiharu Fujimoto, in *Journal of the Mining Institute of Japan*, No. 838, reports measurements of pressure drop between inlet and overflow pipes under various conditions, and suggests a formula relating the pressure to variables.

MINING MISCELLANY

The Larymna mining company of Greece has offered to sell Russia nickel-bearing mineral at a price of $70 a ton. If an agreement is reached, the mines, which are situated in central Greece and suspended their operations last summer, will be able to operate again.

★

Recent developments regarding natural phosphate deposits in the enclave of Cabinda are expected to improve both the industrial and agricultural future of the Province of Angola, West Africa. The Cacata deposit is estimated at 10,000,000 tons, and the Chibuete deposit at 5,000,000 tons.

★

Three representatives of an American aluminium company, Olin Mathieson International Corporation, with headquarters in New York, have returned to Conakry after a short visit to Ghana. It was stated that they hoped to pay another visit to Ghana soon.

★

The first modern coal mine in Sinkiang, China, with a capacity of 900,000 tons, will go into production in 1960 in the Tienshan mountains in the Sinkiang Uighur autonomous area. Tibet's first coal mine has gone into production on the outskirts of Lhasa. It will have an eventual production capacity of 20,000 tons per annum.

★

A copper deposit estimated to contain 10,000,000 tons of copper has been discovered in the Breslau area of East Germany. Exploitation of the deposit is expected to begin in 1959.

★

Results of preliminary metallurgical tests performed by the U.S. Bureau of Mines on mineral samples from large Hawaiian bauxite deposits are given in a technical report just released by the Department of the Interior. The bauxite samples, collected by the Bureau on the islands of Kauai, Maui, and Hawaii during an investigation made in co-operation with the Federal Geological Survey, were tested at the Bureau's laboratories to determine whether they could be beneficiated, or upgraded, by simple methods. Although no products were obtained that could be considered economically competitive with those from commercial bauxite deposits, the Bureau said it believed additional studies were justified "in view of the apparent immensity of the deposits".

★

The Ministry of Natural Resources of the Republic of Honduras have shelved the formation of their Department of Mines and Hydro-carbons, which would supervise all mining and surveying in the Republic. This is due to lack of funds and trained personnel.

★

A geological examination of iron ore deposits at Tonkolili, Sierra Leone, begun in 1956, has confirmed the views of the Sierra Leone Development Co. about the size and quality of the deposits. The company believes that the project should now be proceeded with, provided that the necessary finance can be obtained. Barclays Bank, D.C.O., at Freetown, says that the most recent estimate shows that the scheme would cost over £20,000,000.

★

The Société des Mines des Zenaga, only producer of beryl in Morocco, recently reported that the Angarf mine has been closed indefinitely.

★

A rich deposit of bentonite has been discovered near Parys, in the Orange Free State. As a result of the discovery, seven morgen of the farm Kronebloem has been sold at £1,071 a morgen. South Africa previously imported bentonite from Wyoming, United States, but now, with production at Parys of 25 tons a day, the country has more than it needs.

★

It is believed that fairly extensive deposits of coal and lignite exist in the El Chile area east of Tegucigalpa, Honduras. A French geologist has been lent by the United Nations Technical Assistance Administration to conduct investigations and a complete survey of the area.

★

Private surveys of the iron-ore deposits at El Nispero, Department of Santa Barbara, Honduras, and Agalteca, Honduras, which are known to consist of some 8,000,000 tons only, indicate that extraction might prove uneconomic.

★

The Japanese Yawata Iron and Steel Co. has offered to co-operate with Chilean firms in developing the deposits near Copiapo, Atacama State, to provide supplies for the Japanese iron and steel industry. The Mitsubishi group are planning to form a company to exploit the Copiapo deposits, and eventually it is planned that between 700,000 and 1,000,000 tonnes of ore annually will be shipped to Japan. It is also proposed to construct two ore carriers for exclusive use in ore traffic between Chile and Japan. Rich deposits of iron ore have been discovered near Socaire, in the Andes, to the east of Antofagasta.

★

The Finnish company, Ruskealan Marmori Oy, has discovered an ore bed estimated to contain 2,000,000 tonnes of material assaying 1.5 per cent copper and 1 per cent zinc. It also holds appreciable amounts of silver and nickel. The company has decided to exploit the deposit and to erect a concentrating plant in the area. The products of this plant will be sent for smelting to Juankoski or Sysmajarvi.

★

Sandvikens Jaernverks AB is planning to erect a new factory for the production of tungsten carbide in Vaesterberg, near Stockholm, Sweden. Wolfram oxide is the raw material for the Sandviken brand of carbide called "Coromant". A building permit has been received, but construction is not expected to start before the last quarter next year. Production at the existing factory at Vaesterberg, which was completed in 1957, amounted to 175 tons in 1957, and is expected to be roughly the same this year. Sandvikens Jernverk is currently investing both at home and abroad in plants to produce Coromant. A new one was opened this year in Sao Paulo.

★

The Tasmanian Government has announced that it is prepared to invest £A1,500,000 in expansion of the Aluminium works at Bell Bay to increase output of primary metal from 12,000 to 16,000 tons a year. It has been further stated that, at the invitation of the government, an overseas concern is sending a mission to Australia to examine a proposal to enter into a partnership in the venture and provide capital for expansion.

PERSONAL

Mr. P. A. Ashmead-Bartlett has resigned form the board of the Esperanza Copper and Sulphur Co.

★

Mr. H. Y. Bassett, president of Calumet and Hecla Inc., has been named chairman of the board and chief executive officer of the Alabama Metallurgical Corporation of the U.S., which is constructing a $3,500,000 magnesium producing plant at Selma, Alabama.

★

Mr. E. V. Pearce, A.M.I.M.M., chairman of Malayan Tin Dredging and Southern Malayan Tin Dredging and a director of other Malayan tin mining companies, has died at his home in Surrey. He was 82.

★

Mr. H. Allardt, the European Economic Commission's director-general for overseas countries and territories, has begun a study tour of all the non-European countries associated with the Community by the Treaty of Rome. The aim of his tour is to examine on the spot and in direct contact with the responsible officials and representative bodies, the situation and problems of the regions in question. He will start his tour by visiting Somaliland, French Somaliland, and Madagascar.

★

Mr. H. Richards, A.C.S.M., M.I.M.M., has been appointed chief technical adviser to the West Pakistan Mineral Development Corporation, on loan from the British Government, under the Colombo Plan. As the Pakistan Government has been re-formed recently, it is hoped that some progress may now be possible in organizing and exploiting what mineral deposits exist in that country. Mr. Richards's first responsibility will be to advise on the management and operation of existing mines which the Corporation might have under its control, and also to consider new undeveloped mineral deposits for developing and exploitation.

CONTRACTS AND TENDERS

Ceylon

Tenders are invited for the delivery and erection of all machinery and equipment for an entire factory to produce refined and filler-grade kaolin, and for the supply of all machinery and equipment for one or more sections as specified. Issuing Authority, Ceylon Ceramics Corporation. Address to which bids should be sent: The Chairman, Ceylon Ceramics Corporation, 110 General's Lake Road, Colombo 2, Ceylon. Closing date, January 31, 1959. Ref. E.S.B. 28627/58. Telephone inquiries to Chancery 4411, extension 738 or 771.

Metals and Minerals

Quicksilver Under the Microscope

No recommendations for changes in tariffs have been made by the U.S. Tariff Commission in its factual report on the quicksilver industry, which has been made public. This lengthy report is not yet available in Britain, but a Comtel Reuter cable states that, besides discussing production, exports, imports, and consumption of quicksilver in the United States, it supplies data on quicksilver operations abroad, particularly those in the larger producing countries such as Spain, Italy, and Mexico.

In regard to purchases by the U.S. General Services Administration, the report recalls that, under the 1954-57 programme, the agency had a commitment to buy 200,000 flasks, 125,000 from United States sources and 75,000 from Mexican suppliers. However, it took only 9,248 flasks from United States producers and 775 flasks from Mexican producers. Under the 1958 G.S.A. programme, the purchase commitment is 50,000 flasks—30,000 United States and 20,000 Mexican—but actual purchases up to October 31 were 10,668 flasks from the United States and 2,152 from Mexico.

United States producers found it more profitable to sell to the G.S.A. when the New York market price was less than about $232 to $233 per flask. When the New York price rose above this level in July, 1958, sales to industrial consumers on the Eastern seaboard were resumed. The government purchasing programme thus had the effect of preventing the New York market price from reaching levels much below $232 to $233. This brake on the decline in New York prices will be eliminated, however, with the termination of the government purchase programme at the end of this year. In fact, the price has already slipped below the levels mentioned above and is currently quoted at $226 to $230 per flask f.o.b. New York against $228 to $230 previously.

In London, the quicksilver outlook remains uncertain. The recent sharp reduction by £4 to £74 per flask ex warehouse London is not generally regarded as a helpful development. Although the price had been rather precariously poised for some time, the reduction—regarded in some quarters as having been rather severe for a single cut—has inevitably injected greater uncertainty into the market. Demand is reported to be very quiet, the two foremost considerations in dealers' minds being the scheduled ending of the United States Government purchase programme at the end of this year and the price at which any surplus Italian quicksilver will be sold.

Mexican offers vary in price, generally ranging from £71 10s. down to £70 10s. per flask c.i.f. These prices are below what Mexico can still get from the G.S.A., even after allowing for the import duty.

So far there has been no move from either Spain or Italy to lower their basic price of £80 per flask f.o.b. to meet the continuing competition. Possibly both countries prefer to await further developments for the time being.

A.E.C. DROPS GUARANTEE

The U.S. Atomic Energy Commission has withdrawn its guarantee to buy uranium concentrates from domestic ore reserves developed in the future. A recent announcement states that its promise to buy concentrates produced and delivered between April 1, 1962, and December 1, 1966, would apply henceforth only to "appropriate quantities" from reserves already developed. Purchases from already developed reserves in 1962-1966 will be at the previously established price of $8 a lb. of uranium oxide in an acceptable concentrate. Production from reserves not yet developed will be bought in 1962-66 only as needed and "on such terms and conditions and at such prices" as the A.E.C. may decide.

The commission emphasized that this action had been taken to guard against overproduction of uranium, and was not due to any forecast of a reduction in its uranium requirements or in the potential requirements for commercial atomic power.

Nevertheless, Mr. Gordon Weller, executive vice-president of the Uranium Institute of America, described the change of policy as "extremely alarming". The United States, he pointed out, was continuing to buy from foreign countries at the rate of $1.53 a lb. for uranium concentrate, this average price being higher than that paid in the United States.

Contracts for the sale of Canadian-produced uranium to the United States will not be affected by the commission's action. According to an official of Eldorado Mining and Refining, the A.E.C. has merely confirmed its decision of a year ago, when it reversed its policy of buying all the uranium which could be produced. Action was postponed, however, in order that uranium might be purchased from several mines which were just coming into production and on which large amounts of development funds had been spent. Eldorado has contracts running to April 1, 1962, and April 1, 1963, to supply the A.E.C. with most of the uranium being produced in Canada. It is possible, however, that the decision might cast a shadow over the options which the commission holds to buy Canadian-produced uranium through to December 31, 1966, but this possibility so far in the future can only be a matter for speculation.

Meanwhile, the market for uranium is steadily widening. In this connection it is noteworthy that the International Atomic Agency, based in Vienna, has asked for tenders from eleven member countries, including the United Kingdom, the United States, France and Russia, for three tons of natural uranium. The country whose price is accepted is expected to have the metal ready by August 15 for shipment to the agency member State, which requires the uranium for a research reactor.

Another notable development was the recent start of work on Italy's first nuclear power plant, which is being built by Britain's Nuclear Power Plant Co. on behalf of the AGIP Nucleare, a subsidiary of the ENI-AGIP oil group, at Latina, forty miles south of Rome.

At an official dinner in connection with the opening ceremony, Signor Enrico Mattei, president of ENI-AGIP, said that Italy hoped to be able to meet her uranium requirements in the not too distant future. Two deposits of uranium-bearing minerals had been found in the Alps. One of them appeared to contain about 1,000,000 tonnes of minerals, which should yield approximately 1,000 tonnes of uranium.

FRIA GOES AHEAD

Guinea's vote for independence in the referendum last September and its recent announcement of closer ties with Ghana have again focused attention on the project at Fria, where a plant is being constructed to produce, by 1960, an annual 480,000 tons of alumina from local bauxite. Péchiney has announced that in agreement with its foreign partners it is going ahead with the project. The announcement added that both the French and Guinea governments were in favour of this course. However, financial negotiations regarding the plan to build a power dam on the Konkouré River in Guinea and an aluminium plant near Fria must "take into account the developing situation".

The German metal company, "Vereinigte Aluminum Werke", has become a participant in "Compagnie Internationale pour la Production de l'Alumine" (FRIA), the company formed by French, British, American, and Swiss interests to build the alumina plant at Fria. FRIA announced that negotiations had resulted in the purchase by the German company of 5 per cent of FRIA's capital. The announcement did not specify who had ceded 5 per cent to the German company, or whether FRIA's capital had been increased, but it was indicated that, as a result of this participation, the German firm would have the same obligations as the other companies to finance the venture.

French aluminium producers have announced their intention to form a holding company to finance their African aluminium projects. The new company, to be known as Cie Holding pour l'Aluminium Africain, will be set up by Péchiney, Ugine and the investment company, Cofimer, with an initial capital of 1,000,000,000 frs. to invest in companies producing and marketing alumina and aluminium in Africa.

PHILIPPINE CHROMITE

Production from Philippine chrome mines during the fiscal year July, 1957, to June, 1958, totalled 507,478 tonnes of refractory chromite and 59,441 tonnes of metallurgical chromite, according to figures published by the Philippine Government's Bureau of Mines. The entire output of refractory grade was produced by the Consolidated Mining Co.

COPPER · TIN · LEAD · ZINC

(From Our London Metal Exchange Correspondent)

During the last week, which has been one of the quietest for a long time, a weaker undertone developed for all the main markets, and this, combined with the approach of the Christmas season, led to an appreciable fall in the prices themselves. As is always the case on falling markets, consumers have almost totally withdrawn, and it is to be expected that between now and the end of the year prices will fluctuate within reasonably narrow limits without rhyme or reason.

COPPER PRICE SLIPS FURTHER

The copper market had a short-lived rally at the beginning of the week, but lack of interest soon caused prices to recede. On Wednesday, the Belgians announced they were reducing their price from the equivalent of approximately 29¼ c. per lb. to approximately 28.55 c. per lb. It is believed that one of the reasons for this sharp reduction was the tonnage of copper available in the United States at about 28½ c. per lb., which was on offer by dealers who had bought it in the expectation of being able to ship it to Europe.

Apart from this second-hand copper, there was a weakness on Comex which was reported to be brought about by stop-loss selling. Nevertheless, early in the week the copper situation in America appeared to be fairly stable, with both producers and customs smelters selling fair tonnages at the price of 29 c. per lb. On Wednesday, however, a leading customs smelter reduced his price to 28½ c., and it is expected that the others will follow suit to bring their price below the producers' price, as is normal in times of uninterrupted supply. Although the strike at the International Nickel Co.'s mines in Canada shows no signs of being settled, the price in that country has now been reduced approximately into line with the prices ruling in the United States, the present quotation being 28½ c. Canadian, the difference in the figure being accounted for by the premium on the Canadian dollar.

In the United Kingdom, business is quiet and there is nothing to report other than a slight rise in the stocks in official warehouses at the beginning of this week of 250 tons, giving a total of 6,471 tons. This rising tendency in the stocks and a lack of demand for nearby metal has resulted in the complete elimination of the backwardation, and at times a small contango has appeared, but the majority feeling is that the backwardation will remain with us for some time, albeit at a very low figure. In Europe, there has been some consumer buying, but with the falling prices experienced on Tuesday and Wednesday this demand appears to have dried up. It is doubtful whether purchasing will recommence this side of the new year, although some quarters feel that there may be some buying for tax purposes.

TIN DEMAND KEEPING UP

The tin market has been fairly active, with offerings of both cash and forward metal being well absorbed, and as the latter part of the control period is now approaching, it is expected that prices may move to higher levels. Offerings in Singapore still remain at the rate of approximately 100 tons a day, but here again the expectation is that these tonnages will get less during the coming weeks.

Demand generally remains fairly good and it is interesting to note that the latest figures of the Bureau of Mines gives the United States consumption for September as showing an increase of 5 per cent over the previous month, at 6,380 l.tons of primary and secondary metal. Shipments from Singapore during the second half of November totalled 96¼ tons, whilst shipments from Penang reached 4,089 tons. The shipments from Singapore are very much lower than usual, whilst those from Penang are up to the recent averages.

On Thursday morning, the Eastern price was equivalent to £783 per ton c.i.f. Europe.

LITTLE OPTIMISM OVER NEXT LEAD-ZINC QUOTA

The lead and zinc markets have again been featureless and their movements have been influenced by the movements in the copper price, but the continued backwardation in the zinc market shows that there is still a shortage of this metal and the lessening in the contango in the lead market suggests that supplies in this metal are also not too plentiful. Consumer demand throughout the world remains steady, and it is interesting to note that a German authority suggests that as far as his country is concerned, the outlook for both metals for the first half of next year can be considered as satisfactory.

With nothing having come out of the Geneva conference, the main talking point is now what action the United States Government will take when the present quota period comes to an end, and also whether any barter business involving either lead or zinc will materialize. According to most people, the prospects of an increase in the quota or in the possibility of doing an extensive barter business are not too bright.

Closing prices are as follows:

	Nov. 27 *Buyers*	*Sellers*	Dec. 4 *Buyers*	*Sellers*
COPPER				
Cash	£226	£226½	£218½	£219
Three months	£226½	£226½	£219½	£219½
Settlement	£226½		£219	
Week's turnover	13,375 tons		9,950 tons	
LEAD				
Current ½ month	£74½	£74½	£71½	£71½
Three months	£74½	£74½	£71½	£72
Week's turnover	5,175 tons		5,450 tons	
TIN				
Cash	£759	£760	£753	£753½
Three months	£762	£762½	£756	£756½
Settlement	£760		£753½	
Week's turnover	965 tons		1,170 tons	
ZINC				
Current ½ month	£76½	£76½	£72½	£72½
Three months	£72½	£73	£69	£69½
Week's turnover	8,150 tons		7,000 tons	

LONDON METAL AND ORE PRICES, DEC. 4, 1958

METAL PRICES

Aluminium, 99.5%, £180 per ton
Antimony—
English (99%) delivered, 10 cwt. and over £190 per ton
Crude (70%) £190 per ton
Ore (60%) bases 19s. 6d./20s. 6d. nom. per unit, c.i.f.
Arsenic, £400 per ton
Bismuth (min. 1 ton lots) 16s. lb. nom.
Cadmium 9s. 6d. lb.
Cerium (99%) net, £16 0s. lb. delivered U.K.
Chromium, Cr. 99% 6s. 11d./7s. 4d. lb.
Cobalt, 16s. lb.
Germanium, 99.99%, Ge. kilo lots 2s. 5d. per gram.
Gold, 250s. 4½d.
Iridium, £19/£21 oz. nom.
Lanthanum (98/99%) 15s. per gram.
Manganese Metal (96% - 98%) £290
Magnesium, 2s. 5½d. lb.
Nickel, 99.5% (home trade) £600 per ton
Osmium, £16/£17 oz. nom.
Osmiridium, nom.
Palladium, £5/£5 15s.
Platinum U.K. and Empire Refined £19 10s. oz.
Imported £17 10s./£18 0s.
Quicksilver, £74 0s. ex-warehouse
Rhodium, £40/41 oz.
Ruthenium, £13/£15 oz. nom.
Selenium, 50s. 0d. per lb.
Silver, 76½d. f. oz. spot and 76½d. f'd.
Tellurium, 15s./16s. lb.

ORES AND OXIDES

Bismuth			65% 8s. 6d. lb. c.i.f. 18/20% 1s. 3d. lb. c.i.f.
Chrome Ore—			
Rhodesian Metallurgical (semifriable) 48%	(Ratio 3:1)		£15 15s. 0d. per ton c.i.f.
" Hard Lumpy 45%	(Ratio 3:1)		£15 10s. 0d. per ton c.i.f.
" Refractory 40%			£11 0s. 0d. per ton c.i.f.
" Smalls 44%	(Ratio 3:1)		£14 0s. 0d. per ton cli.f.
Baluchistan 48%	(Ratio 3:1)		£11 15s. 0d. per ton f.o.b.
Columbite, 65% combined oxides, high grade			nom.
Fluorspar—			
Acid Grade, Flotated Material			£22 13s. 3d. per ton ex. works
Metallurgical (75/80% CaF_2)			156s. 0d. ex works
Lithium Ore—			
Petalite min. 3½% Li_2O			40s. 0d./45s. 0d. per unit f.o.b. Beira
Lepidolite min. 3½% Li_2O			40s. 0d./45s. 0d. per unit f.o.b. Beira
Amblygonite basis 7% Li_2O			£25 0s. per ton f.o.b. Beira
Magnesite, ground calcined			£28 0s./£30 0s. d/d
Magnesite Raw (ground)			£21 0s./£23 0s. d/d
Manganese Ore Indian—			
Europe (46% - 48%) basis 55s. 0d. freight			83d./85d. per unit c.i.f. nom.
Manganese Ore (43% - 45%)			70d./75d. per unit c.i.f. nom.
Manganese Ore (38% - 40%)			50d./54d. per unit c.i.f. nom.
Molybdenite (85%) basis			8s. 11d. per lb. (f.o.b.)
Titanium Ore—			
Rutile 95/97% TiO_2 (prompt delivery)			£35/£36 per ton c.i.f. Aust'n.
Ilmenite 52/54% TiO_2			£11 10s. per ton c.i.f. Malayan
Wolfram and Scheelite (65%)			94s. 0d./99s. 0d. per unit c.i.f.
Vanadium—			
Fused oxide 95% V_2O_5			8s./8s. 11d. per lb. V_2O_5 c.i.f.
Zircon Sand (Australian) (65 - 66% ZrO_2)			£14 0s. per ton c.i.f.

Mining Finance

Wall Street and the Equity Standard

The constant pressures created by an economy that must expand or stagnate have increasingly meant that American investors have pinned their faith on equities. Only in this way, they feel, can the purchasing power of their savings be maintained and improved in a world where spending is patriotic and inflation the rule rather than the exception. In many ways, John Doe's reverence for common stocks has its parallel in the Englishman's faith in gold fifty years ago. Both gave a focus to measurements of value. Only the yardstick has changed, and the equity standard has replaced the gold standard.

Recently, however, more and more opinion has tended to the view that Americans may be losing faith in the dollar—that, in fact, Wall Street is beginning to realize that keeping up with the *Dow Jones's* is not the only objective. American interest, it has been thought, was beginning to be shown in Kaffirs for the first time for perhaps 25 years. Support was lent to this view by such events as the buying earlier this year of Homestake, the only major U.S. gold producer; the intermittent buying of Kaffirs on American account both in London and at the Cape; and, above all, the flotation of American South African Investment, which appeared to clinch matters when the initial issue was increased "in view of the interest shown". Still more recently it has been reported that the Bank of Nova Scotia is prepared to issue gold certificates to those of its American customers who want them, and—yes, it's really happened—a firm of Canadian stockbrokers is offering gold blocks to Americans on a 3 per cent margin, the balance payable at any time.

Certainly, all this points in the same direction—a mistrust of the dollar. It may be salutary, however, to look a little deeper.

One of the difficulties in comparing Wall Street with Capel Court is the fact that it is impossible to know how much London's annual turnover amounts to. No one will doubt, however, that the money changing hands in London and Johannesburg by way of dealings in Kaffirs is quite small compared with New York's turnover in common stocks. This means that a small ripple on Wall Street may look like a tidal wave by the time it has crossed the Atlantic.

It is important to bear in mind the limited nature of the American market for foreign—and particularly S. African—issues. The reasons for this are numerous, principally the facts that American investors have such a wide choice of home stocks that they have no need to look abroad, and that compared with the amount of publicity—largely gratuitous—that major U.S. common stocks receive, knowledge about foreign issues is limited to a few dealers and their close connections. Also important in this respect is the extremely bad Press that South Africa continues to receive in the U.S.

It would be quite wrong, therefore, to describe the present disquiet about the dollar, confined as it is to a small and sophisticated group, as a flight from currency, notwithstanding its repercussions overseas. It should be apparent that, were this the case, the gold-share and bullion-holding A.S.A.I.C. would be in active demand on Wall Street, and not merely marking time at a dollar discount. It may well be wondered whether, in fact, the company's bonds may not still be in the process of being leaked out to general ownership with unexpected gradualness by the underwriters and issuing houses concerned.

Nevertheless, facilities for hedging against the dollar are there for all to see.

Which way Wall Street will go from here remains anybody's guess. Local opinion seems to be that the bull market has still many months to run, and there was evidence of this in the weight of buying from bargain-hunters which took the market up after the "readjustment" a fortnight ago. If the view that inflation is inevitable really gets a grip on the bulk of American investors, it still does not follow that switching into gold will become the order of the day—faith in common stocks is still too deep-rooted for this. On the other hand, a comparatively small amount of money (by Wall Street standards) needs to be put into Kaffirs to create a price movement of considerable magnitude. And in spite of the obvious value of the new capital to the industry, the repercussions in the period before the industry expands to absorb it might well be beyond its power to control in a market chronically short of stock.

LONDON MARKET HIGHLIGHTS

While most other sections on the London Stock Exchange were behaving uncertainly during the past week, South African Gold shares remained consistently firm. Johannesburg and the Continent took the initiative, but London was always willing to follow even though an embarrassing shortage of stock occasionally hampered dealings.

A feature of the past week was the search for speculations in embryo gold mines. Time was when the Kaffir market abounded in such stocks, but now that the new goldfields have largely come to fruition there are few mines that have not yet passed out of the purely development stage into gold production.

Consequently, Loraine in their Loraine-Riebeeck form, were persistently bought at the Cape and with little stock available in London the price quickly reached 24s. 1½d. Speculative demand later swung to Zandpan (6s. 6d. premium) and Free State Saaiplaas (16s. 10½d.).

Among the established producers, Free State Geduld (117s. 6d.) and Western Holdings (also 117s. 6d.) moved ahead following the latest record profits in the November returns. East Rand Proprietary (44s. 6d.) eased slightly on their lower profit, but Rand Leases (6s. 6d.) improved on the news that capital repayments—tax free—will be made in place of dividends now that the mine is nearing the end of its life.

From time to time talk is heard that a move will be made to amalgamate the finance concerns in the General Mining group. This theory was given a fresh airing in Johannesburg during the past week and resulted in a strong demand for New Pioneer (42s. 9d.) and Eastern Rand Extensions (30s. 6d.) that may easily have caught London on the wrong foot. General Mining themselves advanced to 110s. in a generally strong Finance group.

Another talking point of the week was the proposal to raise new capital that accompanied the West Wits' report and accounts. The new money will be needed principally for West Wits to take up its entitlement of shares in the new Western Deep company which is opening up an ultra-deep gold proposition to the south of Blyvoor and West Driefontein. New money needs are rarely a bull point in markets these days—no matter how good the reasons—and it says much for the firmness of Kaffirs that West Wits held solidly firm at 52s. 6d. following the finance news.

Copper shares opened the week brightly enough, a burst of enthusiasm lifting Bancroft to a new 1958 peak of 27s. 4½d. Then everything seemed to go wrong—copper prices in New York and London again weakened and Wall Street began to look jittery once more. The share market promptly about-turned and Bancroft led the retreat with a fall to 26s.

Tins and Lead-zincs also wilted with the setback in the respective metal prices. Eastern offerings lowered Southern Malayan to 10s. 10½d. and Consolidated Zinc came back to 56s. 9d. on local sales.

An outstanding exception to the trend was provided by Consolidated Murchison. The shares rose 2s. 6d. to 47s. 6d. to the accompaniment of Cape theories that the current quarter's profit will show a sharp rise and that a good dividend is in prospect.

WEST WITS TO RAISE MORE MONEY

Accompanying the 1958 annual report of West Witwatersrand Areas is a circular detailing proposals for an increase in the capital of the company. The need arises from two events of the past year—the rights offer of shares in Western Deep Levels, made necessary by the accelerated rate at which shaft-sinking has proceeded in recent quarters, and West Wits' acquisition of New Consolidated, Free State, Areas.

West Wits' rights, direct and indirect, in the Western Deeps issue total 1,062,346 shares at par, while the acquisition of New Consolidated F.S.A. reduced the West Wits' working capital to less than the £500,000 which is considered prudent. Additionally, Free State Saaiplaas, in which New Consolidated F.S.A. was substantiallly interested, will be raising fresh capital towards the middle of next year, and West Wits wishes to place itself in a position to participate in whatever plan is decided upon.

These three purposes look like requiring about £1,700,000, and the authorized capital is therefore to be raised by 815,008 shares. Subject to Treasury consent, sufficient shares will then be issued by way of rights at such a price as will raise the necessary £1,700,000.

Certainly, the accounts for the year ended June 30 last leave little room for doubt as to whether the offer, when made, should be taken up or not. Profit topped £1,000,000 for the first time—the actual figure was £1,264,431—and dividends for the year of 3s. 3d. continued the unbroken succession of increases which has continued since the 1s. 3d. total for 1952. Neither is there reason to believe that this progress will not continue for some time yet, for although the rate of progress on the West Wits' line is now beginning to slow down as some of the mines reach or approach their peak production rates, the interests brought in by New Consolidated Free State—notably the holdings in Harmony and Saaiplaas—should compensate for this.

RAND LEASES TO REPAY CAPITAL

At the annual meeting of Rand Leases, the chairman, Mr. S. G. Menell, said that large-scale production at the mine can only be maintained for some two or three years, and thereafter the milling rate will decline rapidly.

In view of this, no interim dividend is to be paid for the half-year to December 31. Instead, the board is recommending a capital repayment of 9d. per share, to be made some time next spring. An E.G.M. will be held in January to consider the necessary resolutions.

Mr. Menell's remarks are on page 644.

NEW PIONEER'S LANDED PROPERTY

In the face of the increased dividends paid by the mines in which New Pioneer (Central Rand) is interested, an increase of only £10,000 odd in profits for 1957-8 is, at first sight, disappointing. It is, in fact, a sharp reminder that as well as being the major holding company for the Lucas Block Mines, New Pioneer is a property company, for although the dividends received by the company were comfortably doubled at £287,019, profit on sales of property were reduced from £104,105 to £9,170.

The reasons for this fall in property sales are explained in the directors' report. It is pointed out that although demand by mining companies is reasonably constant, actual sales are made in bulk at irregular intervals. Additionally, there was a non-recurring item of £18,274 in connection with water reticulation to charge against profits, while £8,779 of the revenue from this year's sales is being held in a suspense account.

Measured by any realistic yardstick, therefore, the results for the year are rather better than they appear at first glance. Above all, the extremely healthy portfolio, which remains the cornerstone of New Pioneer's fortunes, continues to provide growing dividends, and at the same time increases steadily in value. At the date of the latest balance sheet, the market value of the investments was £3,173,593, which, together with property and liquid assets, gave the company a value of about 37s. per share. The value must be considerably higher than this now, and the present quotation of about 41s. looks extremely reasonable in the light of the extremely high potential as a dividend-payer.

NEW UNION TURNS THE CORNER

After two extremely thin years, the recovery of New Union Goldfields in the accounting period to June 30 last lends support to the view that this finance house has now rounded the corner.

Certainly, the upswing in earnings (1957: £17,138; 1958: £237,429) has been dramatic. There can be no doubt, either, that the balance sheet now looks a great deal healthier than it did this time last year. Nevertheless, it would be unwise to place too much emphasis on these factors. As the chairman (Mr. M. E. Rich) points out in his circulated statement (page 643), of the rise in profit of over £111,000, £64,700 was accounted for by the more or less unpredictable item of "profits on realization of investments"—that is to say, sharedealing. The increase attributable to more stable sources of income—dividends on investments and interest on loans—amounted to £46,500.

In these circumstances, the board's dividend policy is impeccable. Although the earned income for the year would have covered a distribution of more than 11½ per cent, only 5 per cent is, in fact, to be paid. "Full consideration", says Mr. Rich, "was given to the desirability of determining a rate which, barring any major setbacks, can be maintained and improved upon out of normal recurring revenue in future years". This is a policy both provident and realistic, for though an established finance house might justifiably regard sharedealing profits as distributable income, New Union's interests are, as yet, largely in the early part of their productive lives, and some years have still to elapse before they reach fruition. It may be wondered, nevertheless, whether the company will not make an exception of the £139,500 of tax-free income derived from the deal with A.S.A.I.C., which would be sufficient for, say, a 5 per cent bonus next year, still leaving a useful sum to go to reserve.

The gold investments of New Union largely consists of the new young mines. The prospects of these are well known, and it need only be said that income from this source should continue to show a good increase for some years to come. As for the more important of the company's new prospects, the position is little changed from last year. An exception is the Carolina Coal Block, where re-calculation of the tonnage of coal available has shown an extractable reserve of 70,000,000 tons, about half of which forms a finite block containing coal with a value of more than 12.2 lb./lb. over 67 in., and the other a similar block containing coal of a grade of 11.2 lb./lb. over 78 in. Both these are unwashed grades, and only a small percentage loss would be entailed in washing to significantly higher values. The coal having been proved, it now seems to be New Union's policy to wait and see which way the economic wind blows.

New Union shares are currently priced to yield only about 4 per cent. For those investors who can afford to lock an investment away against vigorous growth prospects, the New Union portfolio is not without attraction.

SILVERMINES AND CYPRUS MINING

Fresh proposals from the Cyprus Mining Corporation for the exploration of properties owned by the Silvermines Lead and Zinc Co. at Shallee, County Tipperary, have been announced by the chairman of the Eire company, Mr. G. E. Russell, at the annual general meeting. He said that the Cyprus Corporation had recently reported their view that the Eire company's properties constituted a most interesting mining prospect.

The mines at Shallee, which were reopened in 1954, were closed down again last January because the grade of ore mined was disappointingly low and was insufficient to meet operating costs. Diamond drilling at other sections of the property in County Tipperary had disclosed the existence of ore of a higher mineral content, the chairman stated. He added that the cost of proving ore in substantial quantities in those areas would necessitate an extensive exploration programme beyond the financial resources of the company.

Financial News and Results

Ayer Hitam and Sungei Besi.—Results of Sungei Besi and Ayer Hitam differed widely in their last financial years. Ayer Hitam's net earnings rose to £124,796, compared with £40,290 previously. £78,757 was transferred to reserve, and dividends for the year to June 30, 1958, totalled 1s. 3d. against 1s. Sungei Besi, on the other hand, earned £128,030 in the year to March 30, £45,000 less than in the preceding twelve months. In spite of this, Sungei Besi is increasing the year's total distributions to 3s. with a final payment of 7.2d. per share, compared with a total of 2s. 9.6d. for the 1957 financial year. Meetings, London, December 19. Mr. George W. Simms is chairman of both companies.

Malayan and S. Malayan.—Largely as a result of write-backs of tax no longer required because of O.T.C. status, both Malayan Tin and Southern Malayan increased their earnings in the year ended June 30, 1958. Net profit of the former company rose to £430,236 from £400,122, while that of Southern Malayan showed an increase from £322,796 to £584,735. Malayan is placing £240,000 to reserve, and Southern Malayan £235,000. The 8d. per share recommended as a final dividend by Southern Malayan makes the total of distributions for the year 2s. against 1s. 10d. last year. Malayan Tin, however, is recommending a final distribution of 6d., which makes the total for the year 2d. lower at 1s. 10d. Both meetings will be held on December 19. The late Mr. E. V. Pearce was chairman of the two companies.

News and Results—*Continued*

Camp Bird Mine to Reopen.—In view of the improving trend of world metal prices, Camp Bird proposes to reopen its Colorado mine, subject to any adverse changes between now and next summer. Metal content of the reserves is now estimated at more than $20,000,000. Other Camp Bird mining developments include the staking of 284 claims west of Lake Mattagami, Quebec, and an option over a promising auriferous area on the Peninsula de Osa, Costa Rica.

Coronation Syndicate.—In evaluating the prospects of Coronation Syndicate last week, it was wrongly stated that the present yield on the shares was 5.5 per cent. In fact, the yield is almost 14 per cent, and the shares are not, therefore, by any means fully valued.

Sungei Way Profits Down.—Net earnings of Sungei Way Tin Dredging in the year ended June 30 last were $M1,149,866, against $M1,811,840 in the preceding twelve months. The dividend for the year was 5 per cent, against 20 per cent in 1957. As a result of tin restriction, the No. 3 dredge was shut down in May, but the remaining two dredges are working a seven-day week. Meeting, Kuala Lumpur, December 15.

Meru Tin's Earnings.—Meru Tin made a net profit of £2,839 after write-offs in the year to June 30 last. This compares with a loss of £1,770 in the previous year. No dividend is recommended. Meeting, Winchester House, December 31.

No Fresnillo Payment.—The Fresnillo Co. has announced that it will not be possible to declare a dividend for the December quarter.

Giant Yellowknife's Earnings.—Giant Yellowknife Gold Mines earned $239,719 after all charges in the three months to September 30 last; 69,678 tons were milled in the same period for a recovery of 36.798 f.oz. gold.

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NEW UNION GOLDFIELDS, LIMITED

(Incorporated in the Union of South Africa)

ABRIDGED STATEMENT BY THE CHAIRMAN

The Twentieth Annual General Meeting of New Union Goldfields, Limited will be held on December 10, 1958, in Johannesburg. The following is an abridged version of the Statement by the Chairman, **Mr. M. E. Rich,** which was circulated with the Accounts for the year ended June 30, 1958.

Profit and Appropriations

Our total revenue for the year amounted to £297,900, compared with £186,700 in the previous year. Of the increase amounting to £111,200, £64,700 was accounted for by the higher figure for profits on realization of investments, the remaining £46,500 being derived from more stable sources of revenue, such as dividends from investments and interest on loans. Income from investments rose again from £119,700 to £149,600, and it is encouraging to see that our receipts under this heading after averaging a little over £50,000 per annum for the 1954 and 1955 financial years, have risen steadily since then to £108,400 in 1956; £119,700 in 1957; and £149,600 in the year under review. Interest received on loans increased by £4,300 to £16,600, while interest payable on the Note Issue and on our other borrowings was £10,200 lower at £17,400. The net gain of £14,500 under these headings reflects the marked improvement which took place in our liquid position during the year. The net working profit from the operation of the Glenover Phosphate mine, although relatively small at £15,200, reflected only nine months' operations, and is stated after making adequate provision for amortization and after writing-off pre-production expenditure. The net cost of our administration services was appreciably lower at £45,800, compared with £64,200 in 1957. This is far from being a static figure, and is moreover one which must be considered in the context of the overall level of the Company's activities.

The net profit for the year, after taxation but before making any adjustment for the fluctuation in value of investments, was £234,200., which compares favourably with the previous year's figure of £89,500. Whereas it was necessary in 1957 to provide £172,400 to cover diminution in value of investments, the re-valuation of our share portfolio at June 30, 1958, gave rise to a net appreciation of £109,500, which we have transferred to Investment Reserve. Out of the profits for the year, £110,000 has been transferred to specific revenue re-reserves; £100,000 has been absorbed by the declaration of Dividend No. 17 of five per cent.; and the remaining £24,200 has been added to the balance of Unappropriated Profit carried forward.

Dividend and Reserves

This is the first dividend declared by our Company for eleven years, and in fixing the rate at five per cent we have given full consideration to the desirability of determining a rate which, barring any major setbacks, can be maintained and improved upon out of normal recurring revenue in future years. The dividend declared this year is fully covered by recurring revenue and, in fact, the transfers to revenue reserves together with the amount added to the unappropriated balance exceeded the profit on realization of investments. It must not be inferred from this that we are laying down an inflexible dividend policy, and that no portion of our share-dealing profits will ever be regarded as being available for distribution by way of dividends; rather, that for the time being, while we are still expanding and consolidating our position, it is in all our interests that we should pursue a conservative dividend policy.

Over the year we added £235,200 to our revenue reserves, thereby recouping more than half of the £441,900 which we withdrew from these reserves during the two-year period ended June 30, 1957. Total reserves at the end of the year stood at £719,200.

Investments and Liquid Position

At June 30, 1958, the book value of our quoted investments at £1,850,300 showed a decrease of £179,000 on the previous year's figure but in spite of the sales effected during the year to strengthen our liquid position the market value of our quoted investments increased from £2,146,400 to £2,227,300. Over the year we continued to increase our holdings in the various financial companies which we administer, and the shares of which are quoted. These companies, like our own Company, are substantially interested, both directly and indirectly through other financial companies, in a wide spread of producing and developing gold and uranium mines, from which they are now receiving a steadily increasing flow of dividend income, thereby enhancing their own ability to pay increased dividends. During the year we received dividends totalling 6d. and 3½d. per share on our substantial holdings in New Witwatersrand Gold Exploration Company Limited and Lydenburg Gold Farms Company Limited, respectively, compared with 4½d. and 2½d. per share the year before, whilst certain of the other companies falling within this category have been making steady progress towards the stage when they should be in a position to start paying dividends. It is reasonable to assume, therefore, that this section of our investments will make an increasingly important contribution to the future build-up of our revenue position.

During the year we participated in the increase of capital made by Free State Saaiplaas Gold Mining Company Limited and paid the balance of the calls on our partly-paid shares in Winkelhaak Mines Limited, at the same time reducing our investments in certain other large holdings. We received dividends totalling 3/- per share from Dominion Reefs (Klerksdorp) Limited, as against 2/6d. per share last year, and on our Harmony holding the year's dividends totalled 1/9d. per share compared with 1/- the previous year. We held 295,000 Harmony shares on June 30, 1958, while at the same date our associated companies, New Wits. and Lydenburg Gold Farms, held respectively 450,000 and 90,000 of these shares. Since then our own holding has been reduced to 232,400 shares, and those of New Wits. and Lydenburg Gold Farms to 348,000 and 61,400 shares, respectively, as the result of sales to the American-South African Investment Company Limited, which are referred to again later in this statement. Waverley Gold Mines Limited, the small reclamation gold mine which operates on a portion of the old Witwatersrand Gold Mining Company's

property, declared a maiden dividend of five per cent. in June, and we can reasonably look forward to steady dividends from this investment in the future. Through our shareholdings in Witwatersrand Deep Limited and other companies, we are interested in Western Deep Levels Limited, which was registered early in the year to exploit the mining area lying immediately to the south of the Blyvooruitzicht and West Driefontein mines.

Star Diamonds (Proprietary) Limited, the wholly-owned subsidiary of our associated company, Selected Mining Holdings Limited, experienced a satisfactory year, earning a net profit of about £63,000, after tax, on its issued capital of £55,918, and paying a dividend of twenty-five per cent.—its first normal dividend since 1951. The two small tin companies in which we are indirectly interested, Union Tin Mines Limited and Vellefontein Tin Mining Company Limited, both experienced extremely difficult years, and the outlook for these companies is not promising. The mining of the Glenover Phosphate deposit by opencast methods has proceeded satisfactorily since September last year, and although operations have so far been on a small scale we consider that this project has interesting possibilities.

In June of this year the greater portion of Reservoir Hills Township, which lies within the Durban municipal area and is owned by The Modern Town Planning Company Limited, was proclaimed an area for Indian ownership and occupation in terms of the Group Areas Act. The Modern Town Company made a profit for the year of £20,900 after tax, and declared a maiden dividend. At Greystone Park, Salisbury, Southern Rhodesia, the tempo of sales was not maintained in the face of the general slowing down of economic activity in the Federation. However, we do not feel that the present setback is more than temporary, nor that the medium to long-term prospects for our investment are seriously impaired.

Our industrial interests are held mainly through our associated company, New Union General Industries Limited, which maintained its dividend of 2½ per cent. Silverton Tannery Limited experienced a reasonably satisfactory year, increasing its profit in spite of severe competition and sharply fluctuating raw hide prices. The dividend was maintained at 12½ per cent. The Distins-Sagseeds Group of Companies, operating in the seed trade, was able to stem the succession of heavy losses which it had incurred over the preceding three years, and the Group attained roughly a break-square position over the nine months ended March 31, 1958. At New Vaal Farms, income from farming operations is very close to covering farm expenditure before depreciation, although the full development programme will take a further two to four years to complete.

At June 30, 1957, our current liabilities exceeded our current assets by £276,000, in addition to which we owed £5,500 to a subsidiary company and £100,000 to the registered Noteholders. The corresponding position at June 30, 1958, was that our current assets exceeded current liabilities, including the dividend, by £108,700, and we had repaid the loan from the subsidiary company and redeemed £25,000 of the Notes. Over the year, therefore, there was an improvement of £415,200 in our net liquid position. There has since been a further improvement, and we have accordingly given notice of our intention to redeem another £25,000 of the Notes on December 31st next.

Since the close of the year we and certain of our associated companies sold 195,000 Harmony, 100,000 Winkelhaak, and 25,000 Blyvooruitzicht shares to the American-South African Investment Company Limited for £481,747, of which £139,503 accrues to us and £342,244 to the associated companies, including New Wits. and Lydenburg Gold Farms. This transaction was one which fitted in well with our own Group requirements, and gave us a substantial tax free profit.

Exploration

In my Statement last year, I reported on the Carolina Coal Block where our drilling had proved a substantial coal deposit. The estimated tonnage in this deposit has been carefully re-calculated and shows a reserve of approximately 70,000,000 tons of extractable coal. Based on our borehole results, approximately one-half of this tonnage in one clearly defined area has a calorific value as unwashed coal, of not less than 12.2 lbs./lb. with an average seam width of 67″, while the other half, also in a clearly defined area, has a calorific value, again as unwashed coal, of 11.2 lbs./lb. with an average seam width of 78″. Certain additional drilling was carried out on this deposit during the year, particularly in the area around the proposed shaft site, the quality of the coal so exposed conforming fully to the grade proved by the original drilling. To establish a colliery of a size dictated by the economics of coal mining operations and commensurate with the location and extent of the deposit would be a sizeable undertaking, and any final decision in this connection can only be made after all the factors relative to the availability of rail transport and the prevailing pit head price of coal have been taken into account. At the time we originally exercised our option over the Carolina Coal Block we acquired, at no extra cost, extensive coal rights over additional areas. In one such area, near Belfast and called for convenience the Belfast Block, an intensive drilling programme was initiated and has been completed since the close of the year. Some 70,000,000 tons of extractable coal have been proved, of medium grade, constituting a reserve well suited for power purposes.

Conclusion

I think it is reasonable to say that although our results for this last financial year were not spectacular, they marked a turning point in our Company's affairs. Revenue showed a satisfactory increase, many of our developing interests became more remunerative, our investment portfolio ended the year on a sounder basis, and at the same time the deterioration in our liquid position was reversed. Since the end of the year the same rate of progress has been maintained, and we can look to the future with a fair degree of confidence. The strengthening of our cash position both during and since the close of the year will be a most important contributory factor towards our future prosperity. However, we expect that a number of our investment commitments will mature over the next few years and our present cash resources, therefore, are by no means excessive. I hesitate in these uncertain times to make any definite forecast for the current year, but I shall be very disappointed if our results do not show a further improvement upon those for the year under review.

RAND LEASES

(Incorporated in the Union of South Africa)

CAPITAL REPAYMENT FORESHADOWED

The Annual General Meeting of Rand Leases (Vogelstruisfontein) Gold Mining Company Limited was held on December 1 in Johannesburg. The Chairman, **Mr. S. G. Menell**, presided, and said: "Gentlemen,

Since the close of the financial year an average of approximately 180,000 tons per month has been milled. This figure is some 12,000 tons in excess of the average monthly tonnage for the year under review and is attributable to the larger native labour force which has been available to the mine. As I have mentioned in previous reviews, production at your mine is extremely sensitive to seasonal fluctuations in the native labour supply. These fluctuations have for the last five months not been as severe as in previous years and, if the present trend of increasing availability of native labour continues, the present average rate of production should be maintained throughout the current financial year.

Negotiations are proceeding for the granting to your company of a prospecting permit over a triangular area of ground, 127 claims in extent, along the eastern portion of the southern boundary of the mine. Your company is in a position to enter this area as soon as a permit is obtained. In my review which accompanied the Annual Report and Accounts I referred to the fact that the payable ore in the company's claim area is being rapidly depleted. Present trends indicate that large scale production of the order of 160,000-180,000 tons per month can only be maintained for a further two to three years, and that thereafter there will be a large reduction in milling rate.

The time and scope of the reorganization required will depend upon results achieved during the next two to three years. In view of the limited remaining life of the mine and the future reduction in operations, your Board has examined the possibility of ceasing the payment of dividends and in place thereof commencing repayments of capital from such funds as may be considered surplus to the requirements of the company. Your Board has therefore decided not to declare an Interim Dividend for the half year ended December 31, 1958, and to call an Extraordinary General Meeting of Shareholders to be held in January, 1959 to consider their recommendations for commencing repayments of capital in lieu of dividends.

The Board will recommend to the Extraordinary General Meeting of shareholders that subject to confirmation of the court the capital of the company be reduced from £1,800,000 divided into 3,600,000 shares of 10/- each to £1,665,000 divided into 3,600,000 shares of 9/3d each and that such reduction be effected by returning to members paid up capital in excess of the requirements of the company to the extent of 9d per share on each of the aforementioned 3,600,000 shares. The actual date of such payment would be towards the end of April 1959."

The report and accounts were adopted.

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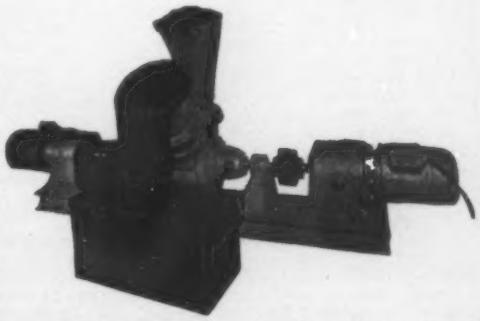

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INCREASED GROUP PROFIT

MR. A. E. PARKINSON'S STATEMENT

The twenty-first annual ordinary general meeting of Sir Lindsay Parkinson & Co., Ltd., was held on December 4 at the Piccadilly Hotel, London, W.1.

The following is an extract from the circulated statement of **Mr. A. E. Parkinson**, chairman :—

Accounts

The Group Profit for 1957 applicable to the Members of the Parent Company before Taxation amounts to £218,428 as compared with £210,144 for 1956. Taxation, including a provision of £2,608 for earlier years, amounts to £121,798 against the charge of £89,527 for 1956. The charge for 1956 was reduced by a credit of £14,024 in respect of provision for earlier years no longer required. The Group Profit and Loss Account Balance carried forward amounts to £304,235 compared with £247,561 brought in. The Consolidated Balance Sheet shows a surplus of Current Assets over Current Liabilities and Provisions amounting to £325,851 compared with £472,058 last year.

Contracts

Home : Our work again included a wide variety of Building and Civil Engineering contracts and our production of Opencast Coal continued at a high level.

Australia : As I indicated last year, the policy in relation to our activities in this country has received special attention. As a result it has been decided to curtail our operations there, for the time being.

Canada : Our Montreal Subsidiary continues to operate satisfactorily.

Cyprus : Work on the contracts in the Island has now been largely completed, and great credit is due to our staff and sub-contractors for all that has been achieved under the very difficult emergency conditions.

British Guiana : This contract has proceeded satisfactorily and will be completed early in 1959.

Ghana : Since my last statement considerable progress has been made on the Tema Harbour contract, which is being carried out by Parkinson Howard Ltd. As you will have seen from the notes upon the Accounts, although interim figures show a loss your Directors consider that our investment in this associated Company should be worth not less than its par value, upon completion of the contract. On a contract of this magnitude it is difficult to assess the eventual financial outcome, although more than half the work has been completed. It now seems probable that the final value of the contract will be very considerably in excess of the original figure of some £8,000,000.

Dividends

The Board has decided to maintain last year's increased dividend on the Ordinary Stock, and a final dividend of 12½ per cent., less tax, making a total for the year of 15 per cent., less tax, is therefore recommended.

Conclusion

Although competition was keener our turnover last year did not suffer greatly from the credit restrictions, and I feel that any expansion in Government spending, to meet unemployment or otherwise, will increase the amount of work available to the Construction Industry. At the present time the value of the work in hand in the Group is of the order of £18 million. Once again it is my pleasure to express appreciation on behalf of myself and the Members to my colleagues on the Board and to all our employees throughout the Group for their loyal and efficient service during the past year.

The report and accounts were adopted.

CHENDERIANG TIN DREDGING

MR. ADDINSELL'S STATEMENT

The annual general meeting of Chenderiang Tin Dredging, Ltd., was held on November 27 in London, **Mr. Jack Addinsell,** the chairman, presiding.

The following is from his circulated statement :—

As shareholders are no doubt aware the International Tin Agreement came into force on December 15, 1957, and the accounts under review include the first period of restriction which operated from the time of the commencement of the Agreement to March 31, 1958, the end of the Company's financial year. It will be seen from the accounts that up to the end of the financial year the company had also contributed £7,877 to the Buffer Stock and since that date further contributions have been made bringing the total at the end of September, 1958, to £9,563. These compulsory contributions, which are now at the rate of $21 per picul, combined with the severity of restriction of production, are causing this company, in line with other tin companies in Malaya, to suffer considerable hardship.

Profits, which were adversely affected by the introduction of restriction, amounted to £5,230 before tax which compares with £16,343 for the previous year, a fall of £11,113. After taking into account the amount brought forward there is £17,692 for appropriation out of which tax requires £2,141, leaving £15,551, from which your directors have decided to transfer £1,000 to Revenue General Reserve and after recommending a dividend of 5 per cent to carry forward £12,395.

The accounts call for no particular comments except perhaps for the item "Stock of Tin Ore" which is now taken in at cost of production and this represents permissible stocks of ore at March 31, 1958, which we are entitled to sell in the next quota period.

Current Year's Quotas

Shareholders will no doubt be anxious to know the effect upon the company of tin restriction which has continued in operation since the commencement of the current financial year. The following quotas have been allotted to the company :—For the period April 1-June 30, 20 tons; for the period July 1-September 30, 21 tons; for the period October 1-December 31, 18¾ tons, making a total for the 9 months of 59¾ tons comparing with 130 tons for the same period in 1957 which, except for the latter half of December, was unrestricted.

In co-operation with the General Managers your directors have been exploring every possible avenue of economy and in anticipation of the seasonal water shortage sufficient stocks of ore were produced at the mine in the quota period ended June 30, 1958, to cover the quota period July 1 - September 30, thus enabling the mine to be operated on the most economical basis.

It had been hoped that the severe degree of restriction introduced would have resulted in the stabilization of the tin price, but as shareholders will have seen in the Press the price dropped by £90 at the end of September. It has since recovered and it would appear that a renewed confidence has resulted by reason of the fact that without the support of the Buffer Stock the price is now above the floor level set by the Tin Restriction Scheme. I need hardly say that this is of vital importance to this company which is a high cost producer.

The report was adopted.

Book Reviews

Environmental Conditions in Coal Mines, *by J. Sinclair, Ph.D.* 341 *pp.*, 122 *illustrations. Pitmans, London.* 50*s.*

This is another textbook in the general mining series currently being published by Sir Isaac Pitman and Sons Ltd., and is a companion volume to *Coal Mining Law*, *Water in Mines and Mine Pumps*, and *Coal Mining Economies*. These books and others yet to be published are designed specifically for those who aspire to managerial positions in Britain, and consequently, throughout the series, the emphasis is on coal mining. The author is Professor of Mining at University College, Cardiff, and has had wide experience in industry and in teaching.

Environmental Conditions in Coal Mines deals with the occurrence, effects, and detection of mine gases; fires and explosions; mining hygiene; rescue work and first-aid, together with the principles and practice of ventilation. Being rather wider in scope than the usual textbook on ventilation, certain detail is necessarily omitted, although the book as it stands is ideally suited for preparing candidates for the many qualifying examinations conducted in the United Kingdom by the universities, technical colleges, the Mining Qualifications Board, and the professional institutions.

From the point of view of the metalliferous miner, the book is lacking in that insufficient space is devoted to such important topics as mine air cooling and the special problems resulting from working at great depth. The material in Professor Sinclair's book has been gathered from a wide range of authoritics, and wherever possible the text is amply illustrated by worked examples illustrating the theory under discussion. Each of the eleven chapters is followed by specimen questions of the type common to the examination room.

Environmental Conditions in Coal Mines is an extremely well written and well-produced work, and should be of great value to all who study—and practise—mining.

*

Only recently has attention been paid to the scientific study of Indian coals, and a study undertaken to cover this deficiency has now been published. *Memoirs of the Geological Survey of India, Volume* 83, *Petrology of Indian Coals*, is issued by the Manager of Publications, Delhi, and printed by the Government of India Press, Calcutta. The author is P. N. Ganju.

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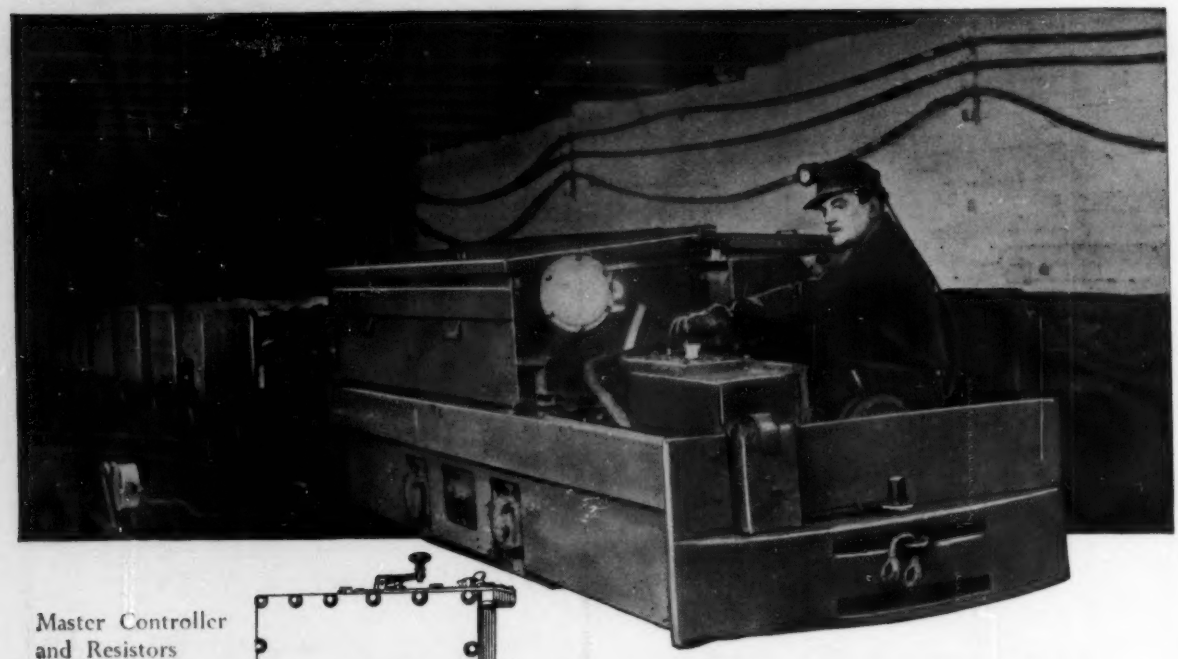

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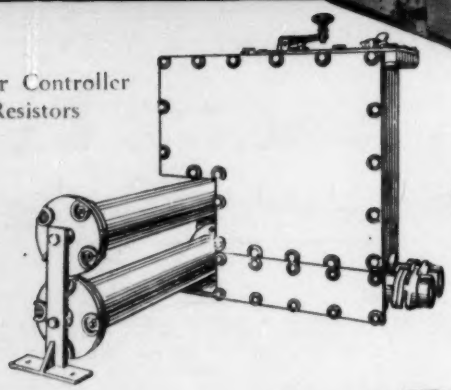

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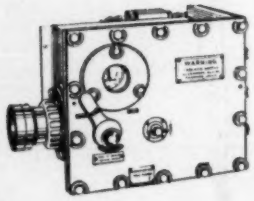

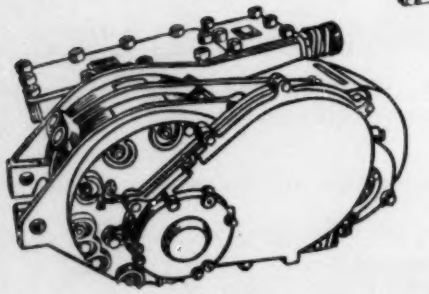

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